Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 22, 2019

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for Crown Site BU: 823530**
AT&T Site ID: 10107966
580 Chapel Street, Thomaston, Litchfield County, CT 06787
Latitude: 41° 39′ 48.48″/ Longitude: -73° 4′ 27.41″

Dear Ms. Bachman:

AT&T currently maintains (6) antennas at the 142-foot level of the existing 175-foot monopole at 580 Chapel Street, Thomaston, Connecticut 06787. The tower is owned by Crown Castle. The property is owned by the Town of Thomaston. AT&T intends to replace (6) of the existing antennas with (6) new antennas, add (3) additional antennas, replace (6) existing RRHS with (12) RRHs, add (1) hybrid, and add (4) DC power cables.

The facility was approved by the Thomaston Zoning Board of Appeals on July 18, 2000 with the following conditions:

1. Conduct an annual RF inspection and submit the results to the Commission.
2. Regrade the driveway as noted in Land Tech's letter dated October 6, 2000.
3. Planmetics dated November 1, 2000, regarding items 12-15.
4. If the Town decides not to have the tower removed, then the site plan and mylar must be revised. Any undertaking regarding the Town's tower shall be done in accordance with the conditions of the signed contract.

AT&T's proposed modification complied with all aforementioned conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to First Selectman Edmond V. Mone, Town of Thomaston, as the property owner, and Jeremy Leifert, Land Use Administrator and Zoning Enforcement Officer for the Town of Thomaston. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Tab 1: Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Tab 2: Exhibit-B: Structural Modification Report
Tab 3: Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: Edmond V. Mone, First Selectman
Thomaston Town Hall
158 Main Street
Thomaston, CT 06787

Jeremy Leifert
Land Use Administrator/Zoning Enforcement Officer
Thomaston Town Hall

158 Main Street
Thomaston, CT 06787

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 22JAN19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **EDMOND V. MONE, FIRST SELECTMAN**
TOWN OF THOMASTON
THOMASTON TOWN HALL
158 MAIN STREET
THOMASTON CT 06787
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J2/D74C/23AD

FedEx Express

E

J191019010701uv

WED - 23 JAN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7742 8120 5534**

EB HFDA

06787
CT-US **BDL**

After printing this label:

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 22JAN19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **JEREMY LEIFERT, ZEO, LUA**
TOWN OF THOMASTON
THOMASTON TOWN HALL
158 MAIN STREET
THOMASTON CT 06787
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J2/D74C/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7742 8123 5824**

WED - 23 JAN 10:30A
PRIORITY OVERNIGHT

06787
CT-US **BDL**

EB HFDA

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ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 22JAN19
ACTWGT: 4.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO MELANIE BACHMAN
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
(860) 827-2951 REF: 1765.6680
INV:
PO: DEPT:

565J2/D74C/23AD

FedEx Express
J191019010701uv

WED - 23 JAN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7742 8125 3179

06051
CT-US BDL

EB BDLA

After printing this label:

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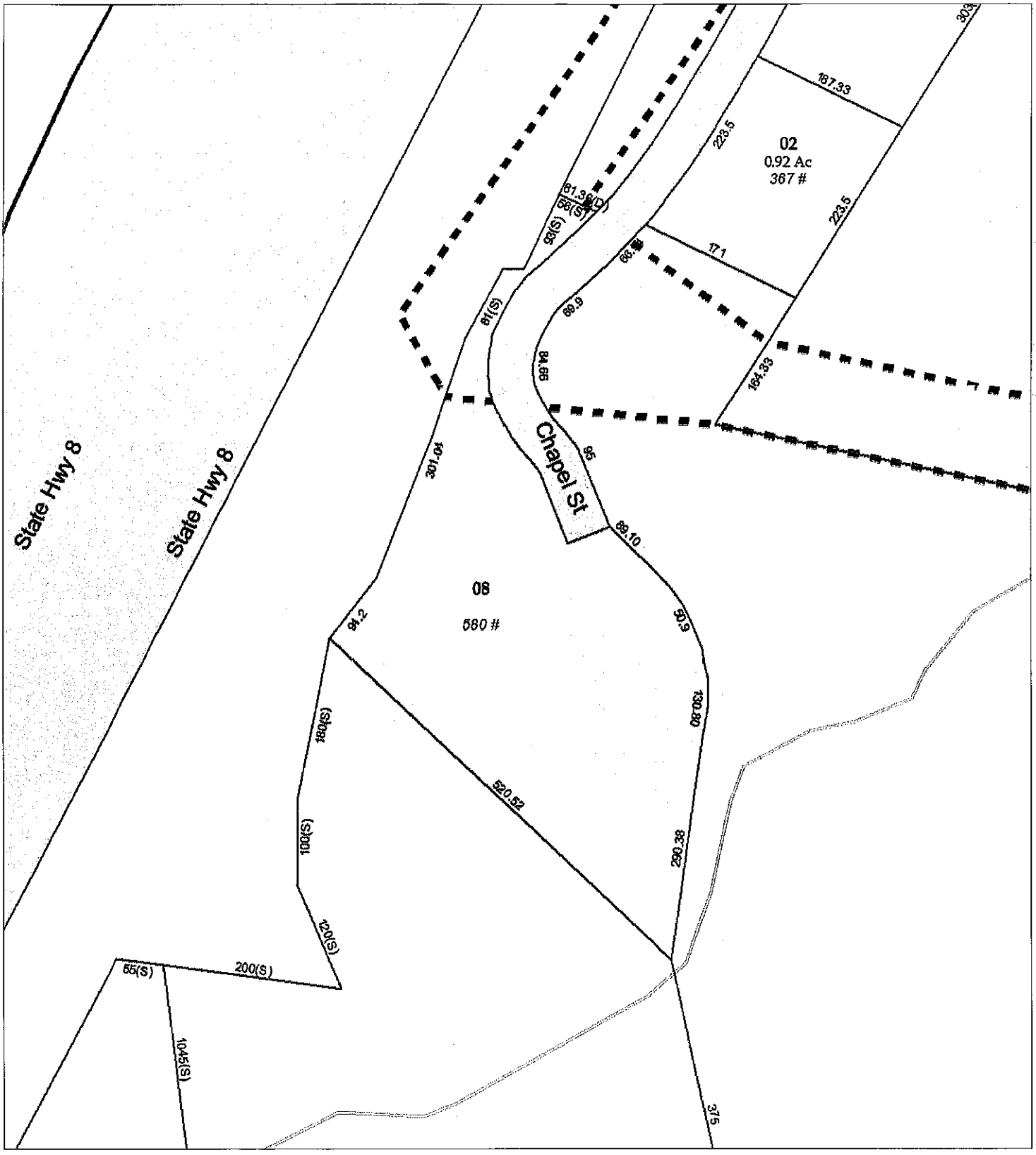
Town of Thomaston, Connecticut - Assessment Parcel Map

Parcel: 55-03-08 **Address:** 580 CHAPEL ST



0 130 260
Feet

Approximate Scale: 1 inch = 145 feet

Map Produced March 2016

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Thomaston and its mapping contractors assume no legal responsibility for the information contained herein.

Thomaston, CT : Commercial Property Record Card

[Back to Search Results] [Start a New Search][Help with Printing]

Search For Properties

Account | **Name** | **Street Name** CHAPEL ST | Search | Reset

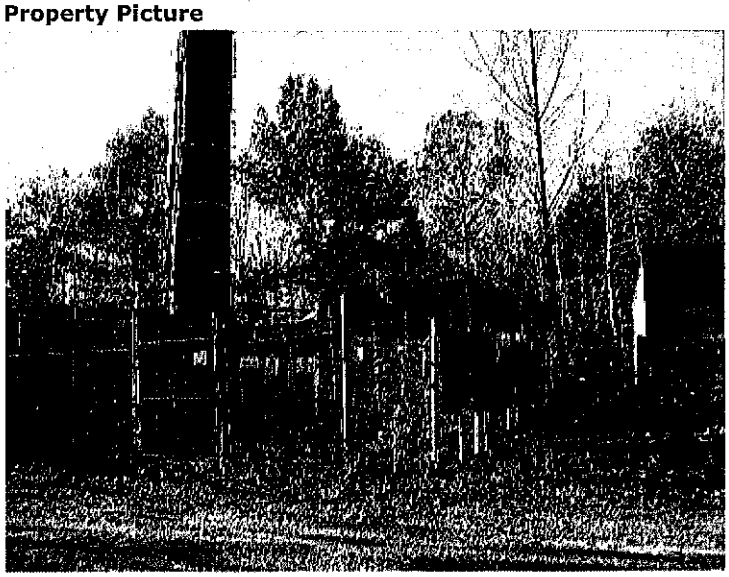
Account	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
T0000001	1	55-03-08A	580 CHAPEL ST	RA80	508 - n/a	0.000

Living Units
0

Owner Information

T Mobile (lessee) Town Of Thomaston (lessor) Crown Castle
Pmb331 4017 Washington Rd
Mcmurray PA 15317

Property Picture



Deed Information

Book/Page: n/a
Deed Date: n/a

Building Information

Building No: 1
Year Built: 1950
No of Units: 0
Structure Type: Phone/Electric Equipment Build
Grade: B
Identical Units: 1

Valuation

Land:	$0
Building:	$473,714
Total:	$473,714
Net Assessment:	$331,600

Sales History

Book/Page	Date	Price	Type	Validity

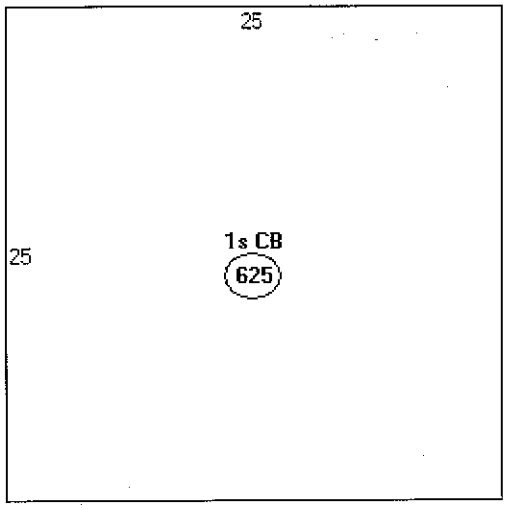
Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD

Exterior/Interior Information

Levels	Size	Use Type	Ext. Walls	Const. Type	Partitions	Heating	A/C	Plumbing	Condition	Func.	Utility	Unadj. RCNLD
01-01	1x620	Multi-Use Storage	Brick/Stone	Fireproof	Normal	None	None	Normal	Good	Good		14850

Building Sketch



Descriptor/Area
A: 1s CB
625 sqft

Notice

Tax Year 2015 Values

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Thomaston, CT.

The providers of this database: CLT, Big Room Studios, and Thomaston, CT assume no liability for any error or omission in the information provided here.

Currently All Values Have Not Been Finalized and Are Subject To Change.

Comments regarding this service should be directed to: rdudek@thomastonct.org.

BUILT BY
bigRoom STUDIOS

THOMASTON ZONING BOARD OF APPEALS
TOWN HALL
THOMASTON, CT 06787

CERTIFICATE OF VARIANCE

This is to certify that the Thomaston Zoning Board of Appeals held a public hearing on July 18, 2000, at 7:45 pm in Meeting Room 1 of the Town Hall on an application from Voice Stream Wireless Corporation of 100 Filley St., Bloomfield, CT. The applicants sought a variance to permit their locating a ground mounted tower for a wireless communications facility on the west side of Chapel Street, approximately 1,000 feet distant from the intersection of Chapel Street with Prospect Street. The proposed tower is 175 feet in height. The applicants requested permission to locate the tower 201 feet from the property line. The property is owned by the Town of Thomaston and is located in an RA-40 zone.

Sec. 27.4.e of the Zoning Regulations of the Town of Thomaston provides that: "...the minimum distance from the base of any proposed ground mounted regulated facility to any property line, roadway, habitable dwelling, business or industrial use, public recreational areas, or public pathway shall be the height of the facility and mount, including any antennas or other appurtenances plus fifty per cent." Thus, 262.5 feet was the required setback.

With quorum present, the Board voted unanimously to grant the variance. The reasons were: topographic considerations; soil conditions on other parts of the site; and concerns over elevation on the site.

ATTEST: Joseph F. Wassong, Jr.

Joseph F. Wassong, Jr.

Chairman, TZBA

Town of Thomaston
Planning & Zoning Board
158 Main Street
Thomaston, Connecticut 06787

Return Receipt Requested

November 9, 2000

Voice Stream Wireless
100 Filley Street
Bloomfield, CT 06002

Re: Special Permit Approval for a Commercial Cellular Telecommunications Tower Chapel Street, Thomaston, Conn.

Dear Sirs:

At its meeting on Wednesday, November 1, 2000, the Thomaston Planning and Zoning Commission approved your Special Permit Application to construct a commercial cellular communications tower on municipal property at the end of Chapel Street.

The application was approved with the following conditions:

1. Conduct an annual RF inspection and submit the results to the Commission.

2. Regrade the driveway as noted in Land Tech's letter dated October 6, 2000.

3. Agreed to the terms and conditions as noted in a FAX from Planimetrics dated November 1, 2000, regarding items 12-15.

4. If the Town decides not to have the tower removed, then the site plan and mylar must be revised. Any undertaking regarding the Town's tower shall be done in accordance with the conditions of the signed contract.

Sincerely,

Samuel Barto
Staff, TPZC
Land Use Officer / ZEO

Town of Thomaston
SELECTMAN'S OFFICE
TOWN HALL
158 MAIN STREET
THOMASTON, CONNECTICUT 06787
283-4421

April 25, 2000

SELECTMEN'S MEETING
MINUTES

At a meeting of the Board of Selectmen held on April 25, 2000 the following business was conducted:

The meeting opened at 4:00 p.m. with the Entire Board in attendance.

Also attending were Thomas C. Cusa of In Telecom, Inc., Sam Barto Town Planner and Attorney George Seabourne.

Selectman Brammer read a Fair Housing Resolution and a Fair Housing Policy Statement. (Copies Attached)

Selectman DuPont made a motion to adopt the Fair Housing Resolution and the Fair Housing Policy Statement seconded by Selectman O'Connell and passed unanimously by Selectman Brammer.

Selectman Brammer explained that as recipients of Small Cities Funding from the Department of Economic and Community Development we must adopt the above to reaffirm our commitment to Fair Housing. Larry Wagner the Town's Grants Coordinator has been the administrator of the Town's projects and programs and Lorraine Babb is our designated representative and is responsible for the enforcement and implementation of the Fair Housing Regulations.

Sam Barto reported to the Board of Selectmen that the roadway system in Phase III of the Highwood Farms Subdivision has been inspected by Town Engineer Bob Oley, Highway Superintendent Gerry Grohoski and by himself and it is their recommendation that it be accepted as a Town Road.

Selectman O'Connell made a motion to approve Phase III Section of the Highwood Farms Subdivision as a Town approved road seconded by Selectman DuPont and passed unanimously by Selectman Brammer.

Selectman DuPont made a motion to add Highwood Farms Subdivision--Phase V to today's Agenda seconded by Selectman O'Connell and passed unanimously by Selectman Brammer.

Selectman O'Connell made a motion to release the lots in Phase V of the Highwood Farms Subdivision in exchange for an irrevocable letter of credit in the amount of $60,000.00 seconded by Selectman DuPont and passed unanimously by Selectman Brammer.

(Copy of Irrevocable Standby Letter of Credit Attached)

Selectman Brammer reported that Representatives from the Water Company will be meeting with him at 9:30 a.m. in his office on April 27th to discuss the design of the Water Extension to upper High Street.

SELECTMEN'S MEETING
MINUTES (Cont'd)

The Board of Selectmen briefly went over Town Attorney Rybak's suggestions for the Proposed Lease Agreement between the Town of Thomaston and Omnipoint Communications, Inc. regarding the Communications Tower on Chapel Street.

Mr. Cusa said looking over the suggested changes, they will be acceptable, however items that might involve Federal Regulations would be out of their control.

Selectman O'Connell made a motion to accept the Proposed Lease Agreement between the Town of Thomaston and Omnipoint Communications, Inc. with the suggested changes made by Attorney Rybak and subject to the approval of the Inland Wetlands Commission, Planning and Zoning Commission and Town Meeting Approval seconded by Selectman DuPont and passed unanimously by Selectman Brammer.

Selectman DuPont made a motion to approve Glenn C. Clarks request that his remaining vacation time for this year (4 days) be held past his anniversary date of July 6,2000 as he is going on a cruise in May of 2001 seconded by Selectman O'Connell and passed unanimously by Selectman Brammer.

At 4:32 p.m. Selectman DuPont made a motion to adjourn the meeting seconded by Selectman O'Connell and passed unanimously by Selectman Brammer.

Signed _____
Clifford C. Brammer, Jr.
First Selectman

Signed _____
Roger DuPont
Selectman

Signed _____
Richard A. O'Connell
Selectman

Town of Thomaston
Planning & Zoning Board
158 Main Street
Thomaston, Connecticut 06787

August 7, 2000

Voice Stream Wireless
100 Filley Street
Bloomfield, CT 06002

Attn: Mr. Rick Frazier

Re: Special Permit Application for a Commercial Telecommunications Tower and Facility

Dear Mr. Frazier:

At its meeting on August 2, 2000, the Thomaston Planning and Zoning Commission accepted your Special Permit Application. The public hearing is scheduled for Wednesday, September 6, 2000, at 7:00 p.m. The meeting will be held in the Lena Morton Art Gallery.

The Commission has scheduled an on-site inspection for Wednesday, August 30, 2000, at 6:30 p.m. In accordance with the Zoning Regulations, Section 27.7, Part L, the Commission requests that you send aloft a site identification balloon on or just prior to the day of inspection. My office will publish a legal notice prior to the raising. The site walk will be open to the public.

Please make sure to address each of the requirements in Article XXVII at the public hearing. This should insure a very thorough and informative public hearing.

If you have any questions, comments or suggestions, please feel free to call the Land Use Office at 283-8411.

Sincerely,

Samuel Barto
Land Use Officer

Please Note: The balloon shall also be raised at least 3 days prior to the public hearing.

cc: Bruce Hoben

SPECIAL PERMIT APPLICATION

Town of Thomaston, Connecticut

Date Received:

Application for a Special Permit

Applicant: VoiceStream/Omnipoint Wireless

Address: 100 Filley St Bloomfield, CT 06002

The undersigned hereby makes application to the Planning and Zoning Commission for a SPECIAL PERMIT in accordance with the provisions of Section 3.11 - Schedule A - Permitted Uses and Article IX of the Thomaston Zoning Regulations.

Signature: [signature] Date: 7/24/00

Section 1. Previous Application

Has a previous Special Permit Application been filed with the Commission for the same premises? Yes: _____ No: ✓

Section 2. Placement on Agenda

In order for the Commission to consider your application, it must be received in the Planning and Zoning Office (Land-Use Office) no later than five (5) working days prior to the next regularly scheduled meeting.

Section 3. Plans and Documentation

All Special Permit applications, unless otherwise prescribed in the Zoning Regulations or directed by the Commission, must be accompanied by the following documentation:

Town of Thomaston
Planning & Zoning Board
158 Main Street
Thomaston, Connecticut 06787

August 7, 2000

Voice Stream Wireless
100 Filley Street
Bloomfield, CT 06002

Attn: Mr. Rick Frazier

Re: Special Permit Application for a Commercial Telecommunications Tower and Facility

Dear Mr. Frazier:

At its meeting on August 2, 2000, the Thomaston Planning and Zoning Commission accepted your Special Permit Application. The public hearing is scheduled for Wednesday, September 6, 2000, at 7:00 p.m. The meeting will be held in the Lena Morton Art Gallery.

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Please make sure to address each of the requirements in Article XXVII at the public hearing. This should insure a very thorough and informative public hearing.

If you have any questions, comments or suggestions, please feel free to call the Land Use Office at 283-8411.

Sincerely,

Samuel Barto

Samuel Barto
Land Use Officer

Please Note: The balloon shall also be raised at least 3 days prior to the public hearing.

cc: Bruce Hoben

a. A "Statement of Use" which shall detail the proposed use of the site.

b. Site Plan and Landscaping Plan.

c. Architectural and Construction Plan

d. Flood Hazard Area Data

e. Soil Erosion and Sedimentation Control Plan

f. All other pertinent information and documentation that may be required by the Commission in order to make a decision on the application.

Section 4. Application Fees

a. Standard Application Fee: $ 150.00

b. Home Occupation Permit: $ 100.00

Section 5. Waiver of Requirements

Does the applicant request the Commission to waive any of the required documentation as specified in Sections 9.3.2, 9.3.3 or 9.3.4 of the Zoning Regulations?

Yes: _____ No: _____

If yes, please specify: _____

_____

Section 6. Extension of Review Period

Will the applicant consent to a formal extension of time in order for the Commission to take action on this application?

Yes: _____ No: _____

If yes, please specify period or date: _____

_____

Section 7. Failure to Submit

Failure by an applicant to submit any or all of the required or requested documentation under Section 3.11 or Article IX may be grounds for the Commission to consider the application as being incomplete.

Section 8. Review by Town Engineer

The applicant shall be responsible for paying all inspection and review costs incurred by the Town Engineer during the review process.

If additional on-site inspection and review is necessary and required by the Commission after the approval is granted and prior to completion of the project, the applicant shall also be responsible for these costs.

The costs shall be no more per hour than what is assessed to the Town in any given year by the Town Engineer.

Section 9. Public Hearing

The Thomaston Planning and Zoning Commission will conduct a "Public Hearing" on this application. The applicant, or their authorized agent, must be present at the hearing and should be prepared to present information showing how the proposed use of the site along with the buildings, structures, and facilities will conform to the standards as specified in these Regulations.

All standards as specified in Article IX are in addition to other requirements as contained in the Regulations which may be applicable in the District in which the Special Permit is proposed.

Section 10. Inspection of Property

The Commission is authorized by the submission of this application to inspect the premises.

Section 11. Additional Information

The Commission may obtain additional documentation and information on its own initiative but will need to rely upon data presented to it by the applicant.

Section 12. Modification of Approval

If approval is granted by the Planning and Zoning Commission, it may be subject to modifications deemed necessary to conform to specific standards of the Regulations. It may also be subject to appropriate conditions and safeguards necessary to conserve public health and safety, convenience, welfare and property values in the neighborhood.

Applicants Signature: _____

Home Phone: 860 693 2724 Business Phone: 860-677-5267

OFFICE USE

Commission date when application was received: _____

Date of initial Public Hearing: _____

Public Hearing was continued to: _____

Date of Approval: _____ Disapproval: _____

Was approval modified: Yes: _____ No: _____

If yes, give specifics: _____

Land-Use Officer: _____ Date: _____

Samuel L. Barto
Staff, PZC

PROJECT INFORMATION

SCOPE OF WORK: ITEMS TO BE MOUNTED ON THE EXISTING TOWER:

- INSTALL AT&T ANTENNA (HPA-65R-BUBAA) (TYP. OF 1 ALPHA & GAMMA SECTOR, TOTAL OF 2).
- INSTALL AT&T ANTENNA (HPA-65R-BU4AA) (BETA SECTOR ONLY, TOTAL OF 1)
- INSTALL AT&T ANTENNA (800-10965) (TYP OF 2 ALPHA & GAMMA SECTOR, TOTAL OF 4)
- INSTALL AT&T ANTENNA (800-10964) (TYP OF 2 BETA SECTOR ONLY, TOTAL OF 2)
- INSTALL AT&T 4478 B14 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4415 B30 (WCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4449 B5/B12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 8843 B2/B66A (AWS/PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T DC-6 SURGE ARRESTOR (TOTAL OF 2)
- INSTALL AT&T DC TRUNK CABLES (TOTAL OF 4) & FIBER TRUNK CABLE (TOTAL OF 1)

ITEMS TO BE MOUNTED INSIDE EXISTING SHELTER:

- INSTALL XMU-03 (TOTAL OF 1)
- INSTALL 6630 (TOTAL OF 2)
- INSTALL 6601 (TOTAL OF 1)

ITEMS TO REMAIN:

- (3) ANTENNAS & (6) TMAS.
- (1) DC-2

SITE ADDRESS:	560 CHAPEL STREET THOMASTON, CT 06787
LATITUDE (NAD 83):	N 41° 39' 48.44"
LONGITUDE (NAD 83):	W 73° 04' 27.41"
LANDLORD:	CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK, STE 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE/ INDOOR
TOWER HEIGHT:	175'
RAD CENTER:	143'
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

at&t

SITE NUMBER: CTL01062

FA LOCATION CODE: 10107966

SITE NAME: CHAPEL STREET

CROWN SITE NAME: CT364/CHAPEL ST. MONOPOLE

PROJECT: LTE6C/5C/4C/3C/4TX4RX/SOFTWARE RETROFIT/4TX4RX SOFTWARE RETROFIT

PACE ID: MRCTB035247, MRCTB035256, MRCTB035220, MRCTB035081, MRCTB035326, MRCTB035328

BU#: 823530

NOTE:

ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PRE-APPROVAL TO ENTER THE PROPERTY MUST BE OBTAINED. FOR ACCESS AUTHORIZATION, PLEASE CONTACT CROWN.

DRAWING INDEX

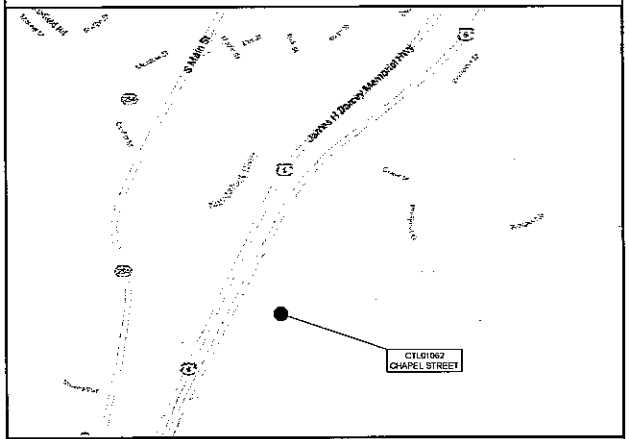
SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
C-1	SITE PLAN
C-2	EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION
C-3	EXISTING & PROPOSED ANTENNA LAYOUT
C-4	EQUIPMENT DETAILS I
C-5	EQUIPMENT DETAILS II
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

CROWN CASTLE SITE ID #: 823530
CROWN CASTLE SITE NAME: CT364/CHAPEL ST. MONOPOLE

ENGINEERING

2018 CONNECTICUT STATE BUILDING CODE
2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
ANSI/TIA-222-G

VICINITY MAP



DEPART 550 COCHITUATE ROAD, FRAMINGHAM, MA 01701, I-91 SOUTH TOWARD NEW HAVEN. TAKE EXIT 16 TOWARD MERIDEN/WATERBURY. MERGE ONTO I-84 W, VIA EXIT 1 ON LEFT TOWARD WATERBURY. MERGE ONTO CT-8 NORTH VIA EXIT 20/TORRINGTON. TAKE US-6 E, EXIT 39 TOWARD THOMASTON, RIGHT ONTO US-6/EAST MAIN STREET, RIGHT ONTO PROSPECT STREET, RIGHT ONTO CHAPEL STREET, FOLLOW TO END OF CUL-DE-SAC, SITE IS ON RIGHT.

GENERAL NOTES

1. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

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SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC
125 SUMMER AVENUE, SUITE 600
BOSTON, MA 02116

STATE OF CONNECTICUT — No. 0029052 — LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERICSSON
DRAWN BY	JB
CHECKED BY	CAT

SUBMITTALS

1	01/03/19	FOR CONSTRUCTION
0	12/20/18	ISSUED FOR PERMITTING

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FA# 10107966
SITE# CTL01062
CHAPEL STREET
560 CHAPEL STREET
THOMASTON, CT 06787

TITLE SHEET

T-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION

2.2 MATERIALS AND EQUIPMENT.

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.

2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.

3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.

4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED

2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.

3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.

4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.

5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.

2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.

3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.

2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.

3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.

4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.

5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.

6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

6. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.

7. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC

G. PANELS AND LOAD CENTERS:

1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.

2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.

3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).

4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.

5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.

6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.

7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.

8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.

9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.

10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END

11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS

12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.

13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.

3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.

4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED

D. GROUNDING.

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.

2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.

3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES

4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2

5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING

6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS

7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED

8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.

9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS

10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS

11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES

12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.

13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE

14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES

15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.

16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS

2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS

3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES

4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS

at&t
5041 BRIDGE STREET
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3 CORPORATE PARK DRIVE
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JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVE 5th, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERCC0004
DRAWN BY	JB
CHECKED BY	CAT

SUBMITTALS

1	01/05/19	FOR CONSTRUCTION
0	12/20/18	ISSUED FOR PERMITTING

FA# 10107966
SITE# CTL01062
CHAPEL STREET
580 CHAPEL STREET
THOMASTON, CT 06787

GENERAL NOTES I

GN-1

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION, WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS, IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM, GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE
SINGLE POLE SWITCH
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE
FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8
EXISTING SMOKE DETECTION (DC)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE
EXISTING CHAIN LINK FENCE — x — x — x
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE — W — W — W — W — W
PROPOSED UNDERGROUND POWER — UGP — UGP — UGP — UGP
PROPOSED UNDERGROUND TELCO — UGT — UGT — UGT — UGT
PROPOSED OVERHEAD POWER — OHP — OHP — OHP — OHP
PROPOSED OVERHEAD TELCO — OHT — OHT — OHT — OHT — OHT
PROPOSED OVERHEAD UTILITIES — OHT — OHT — OHT — OHT — OHT
PROPOSED ABOVE GROUND POWER — AGP — AGP — AGP — AGP — AGP
PROPOSED ABOVE GROUND TELCO — AGT — AGT — AGT — AGT — AGT

CALLOUT REFERENCE: (X)
REVISION REFERENCE: 1
WORKPOINT: WP
SECTION REFERENCE: XX / X-X
DETAIL REFERENCE: XX / X-X
ELEVATION REFERENCE: X / X

THESE DOCUMENTS ARE IN COMPLIANCE WITH AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOW CODES AND STANDARDS AS APPLICABLE: 2018 CONNECTICUT STATE BUILDING CODE, 2017 NATIONAL ELECTRIC CODE OR LATEST EDITION.

AB	ANCHOR BOLT	COL	COLUMN	FIN	FINISH(ED)	MAS	MASONRY	QTY	QUANTITY	TOF	TOP OF FOUNDATION
ABV	ABOVE	COMM	COMMON	FLR	FLOOR	MAX	MAXIMUM	RAD	RADIUS	TOP	TOP OF PLATE (PARAPET)
AC	ALTERNATING CURRENT	CONC	CONCRETE	FDN	FOUNDATION	MB	MACHINE BOLT	RECT	RECTIFIER	TOS	TOP OF STEEL
ADDL	ADDITIONAL	CONSTR	CONSTRUCTION	FOC	FACE OF CONCRETE	MECH	MECHANICAL	REF	REFERENCE	TOW	TOP OF WALL
AFF	ABOVE FINISHED FLOOR	DBL	DOUBLE	FOM	FACE OF MASONRY	MFR	MANUFACTURER	REINF	REINFORCEMENT	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
AFG	ABOVE FINISHED GRADE	DC	DIRECT CURRENT	FOS	FACE OF STUD	MGB	MASTER GROUND BAR	REQ'D	REQUIRED		
AIC	AMPERAGE INTERRUPTION CAPACITY	DEPT	DEPARTMENT	FOW	FACE OF WALL	MIN	MINIMUM	RET	REMOTE ELECTRIC TILT	TYP	TYPICAL
ALUM	ALUMINUM	DF	DOUGLAS FIR	FS	FINISH SURFACE	MISC	MISCELLANEOUS	RMC	RIGID METALLIC CONDUIT	UG	UNDERGROUND
ALT	ALTERNATE	DIA	DIAMETER	FT	FOOT	MTL	METAL	RRH	REMOTE RADIO HEAD	UL	UNDERWRITERS LABORATORY
ANT	ANTENNA	DIAG	DIAGONAL	FTG	FOOTING	MTS	MANUAL TRANSFER SWITCH	RRU	REMOTE RADIO UNIT	UNO	UNLESS NOTED OTHERWISE
APPROX	APPROXIMATE	DIM	DIMENSION	GA	GAUGE	MW	MICROWAVE	RWY	RACEWAY	UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
ARCH	ARCHITECTURAL	DWG	DRAWING	GEN	GENERATOR	(N)	NEW	SCH	SCHEDULE		
ATS	AUTOMATIC TRANSFER SWITCH	DWL	DOWEL	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NEC	NATIONAL ELECTRIC CODE	SHT	SHEET	UPS	UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
AWG	AMERICAN WIRE GAUGE	(E)	EXISTING	GLB	GLUE LAMINATED BEAM	NO.(#)	NUMBER	SIAD	SMART INTEGRATED DEVICE		
BATT	BATTERY	EA	EACH	GLV	GALVANIZED	NTS	NOT TO SCALE	SIM	SIMILAR	VIF	VERIFIED IN FIELD
BLDG	BUILDING	EC	ELECTRICAL CONDUCTOR	GPS	GLOBAL POSITIONING SYSTEM	OC	ON CENTER	SPEC	SPECIFICATION	W	WIDE
BLK	BLOCK	EL	ELEVATION	GND	GROUND	OPNG	OPENING	SQ	SQUARE	W	WITH
BLKG	BLOCKING	ELEC	ELECTRICAL	GSM	GLOBAL SYSTEM FOR MOBILE	(P)	PROPOSED	SS	STAINLESS STEEL	WD	WOOD
BM	BEAM	EMT	ELECTRICAL METALLIC TUBING	HDR	HEADER	P/C	PRECAST CONCRETE	STD	STANDARD	W.P.	WORK POINT
BTC	BARE TINNED COPPER CONDUCTOR	ENG	ENGINEER	HGR	HANGER	PCS	PERSONAL COMMUNICATION SERVICES	STL	STEEL	WP	WEATHERPROOF
BOF	BOTTOM OF FOOTING	EQ	EQUAL	HVAC	HEAT/VENTILATION/AIR CONDITIONING	PCU	PRIMARY CONTROL UNIT	STRUCT	STRUCTURAL	WT	WEIGHT
CAB	CABINET	EXP	EXPANSION	HT	HEIGHT	PRC	PRIMARY RADIO CABINET	TEMP	TEMPORARY		
CANT	CANTILEVERED	EXT	EXTERIOR	IGR	INTERIOR GROUND RING	PP	POLARIZING PRESERVING	THK	THICKNESS		
CEC	CALIFORNIA ELECTRIC CODE	FAB	FABRICATION	IN	INCH	PSF	POUNDS PER SQUARE FOOT	TMA	TOWER MOUNTED AMPLIFIER		
CHG	CHARGING	FF	FINISH FLOOR	INT	INTERIOR	PSI	POUNDS PER SQUARE INCH	TN	TOE NAIL		
CLG	CEILING	FG	FINISH GRADE	LB(S)	POUND(S)	PT	PRESSURE TREATED	TOA	TOP OF ANTENNA		
CLR	CLEAR	FIF	FACILITY INTERFACE FRAME	LF	LINEAR FEET	PWR	POWER CABINET	TOC	TOP OF CURB		

at&t
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EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER
01/09/2019 16:09:46-05:00

PROJECT NO: ERCC0004
DRAWN BY: JB
CHECKED BY: CAT

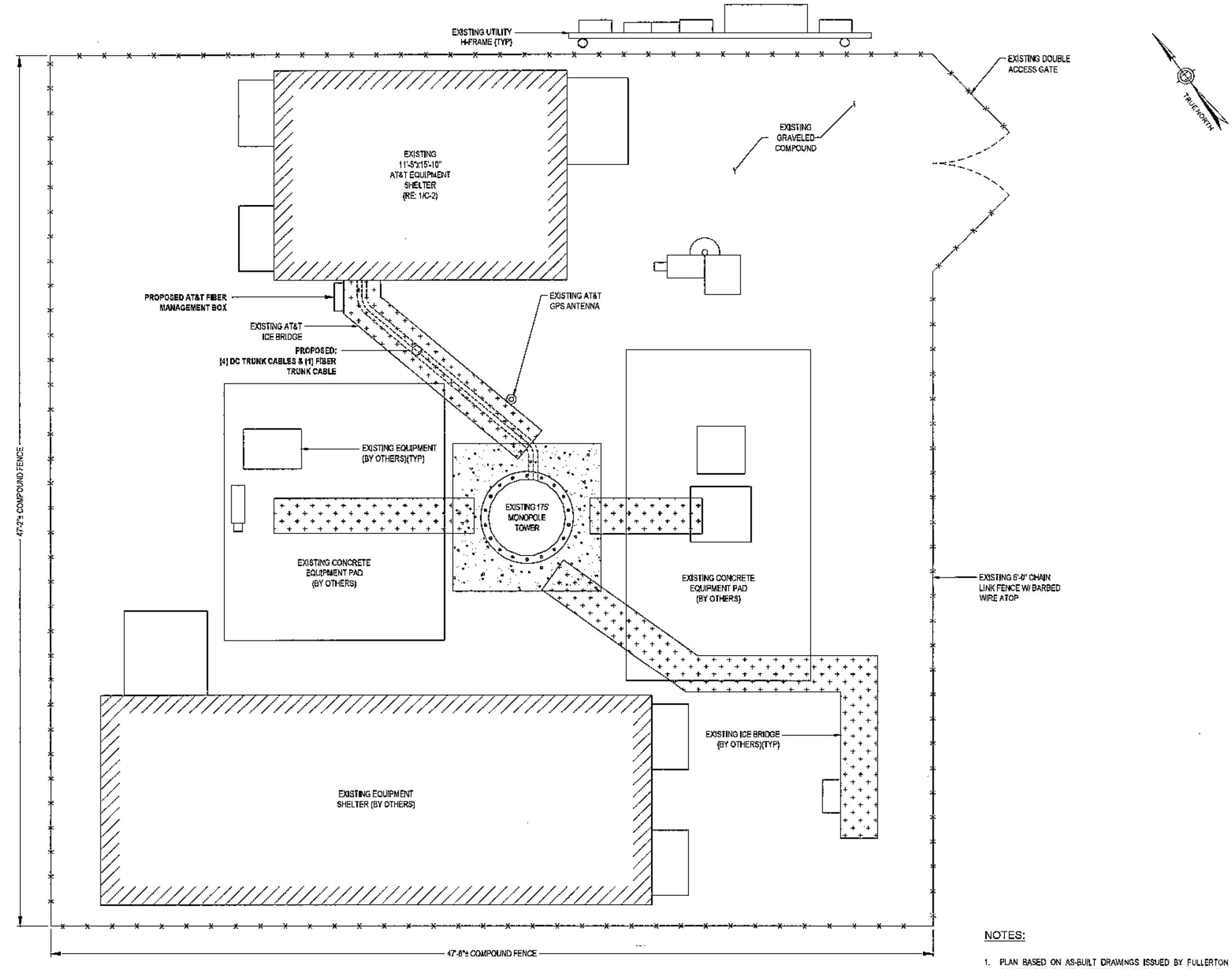
SUBMITTALS

1	01/08/19	FOR CONSTRUCTION
D	12/20/18	ISSUED FOR PERMITTING

FA# 10107966
SITE# CTL01062
CHAPEL STREET
580 CHAPEL STREET
THOMASTON, CT 06787

GENERAL NOTES II

GN-2



NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY FULLERTON ENGINEERING ON 11/29/16. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.

1 SITE PLAN

SCALE: 3/8" = 1'-0"

at&t
5041 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERCC0084
DRAWN BY	JB
CHECKED BY	CAT

SUBMITTALS

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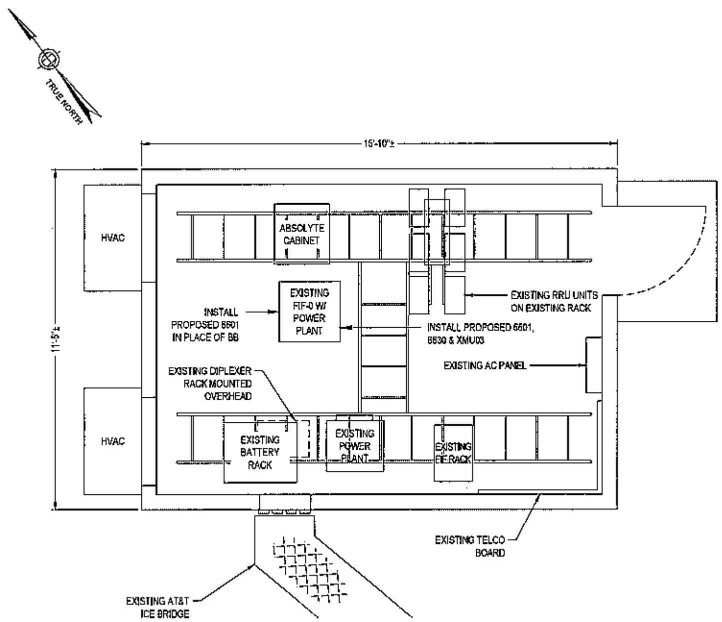
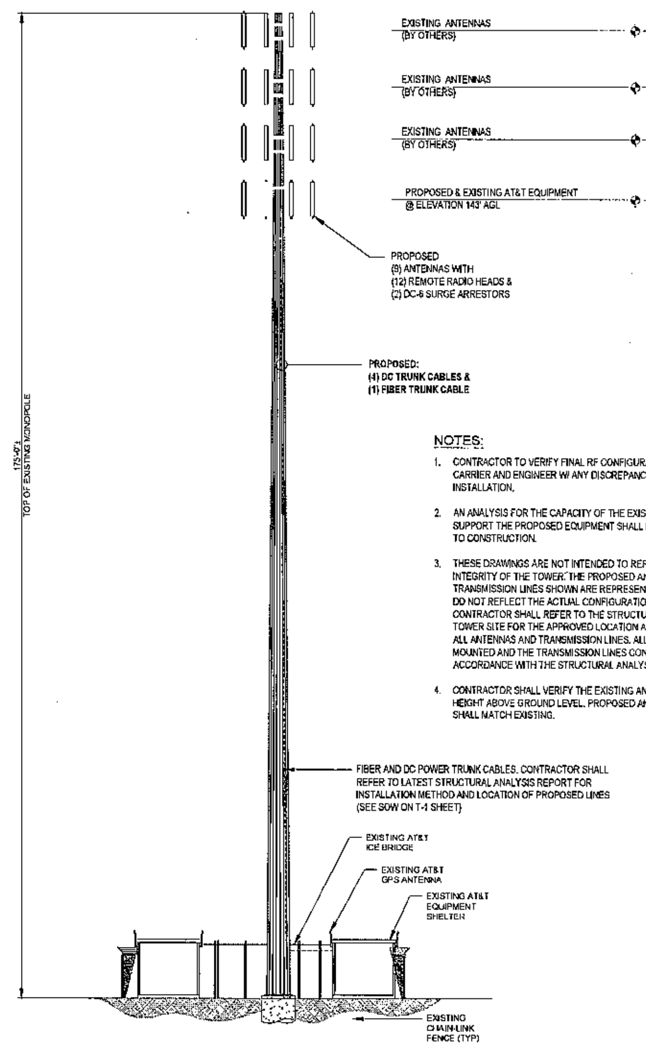
FA# 10107966
SITE# CTL01062
CHAPEL STREET
560 CHAPEL STREET
THOMASTON, CT 06787

SITE PLAN

C-1



1 EQUIPMENT LAYOUT — SCALE: 1/2"=1'-0"



NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
3. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND TRANSMISSION LINES SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE STRUCTURAL ANALYSIS OF THIS TOWER SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND TRANSMISSION LINES. ALL ANTENNAS MUST BE MOUNTED AND THE TRANSMISSION LINES CONFIGURED IN STRICT ACCORDANCE WITH THE STRUCTURAL ANALYSIS.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.

2 TOWER ELEVATION — SCALE: 3/32" = 1'-0"

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5841 BRIDGE STREET
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CROWN CASTLE
3 CORPORATE PARK DRIVE
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JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT — No. 0029052 — LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERC00004
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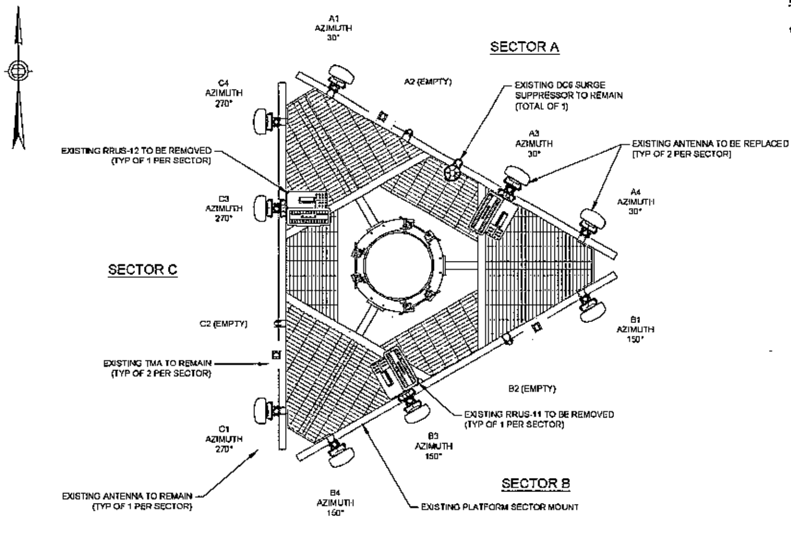
FA# 10107966
SITE# CTL01062
CHAPEL STREET
560 CHAPEL STREET
THOMASTON, CT 06787

EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

C-2



ELEVATION 143'

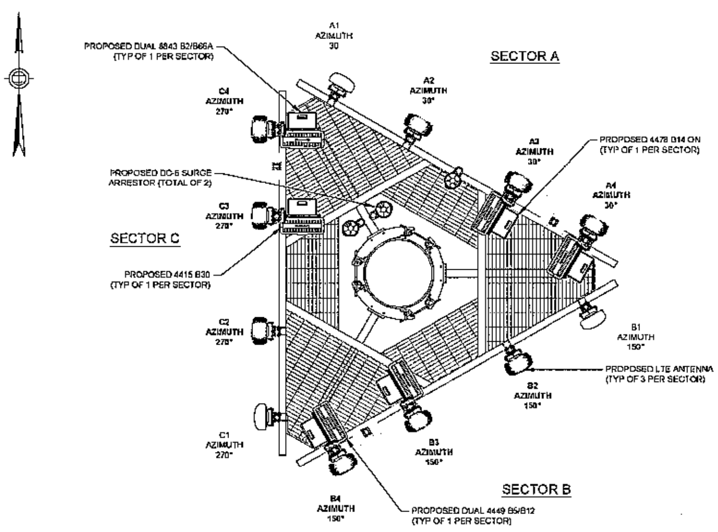
NOTES:

1. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND ASSOCIATED EQUIPMENT SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE MOUNT ANALYSIS OF THIS SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND EQUIPMENT. ALL ANTENNAS AND EQUIPMENT MUST BE MOUNTED IN STRICT ACCORDANCE WITH THE MOUNT ANALYSIS.

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

DO NOT INSTALL PROPOSED SQUID OR SURGE SUPPRESSOR ON TOWER LEG



ELEVATION 143'

1 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

at&t
5001 BRIDGE STREET
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3 CORPORATE PARK DRIVE
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120 ST. JAMES AVENUE, 5TH FLOOR
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STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERC00084
DRAWN BY	JB
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SUBMITTALS

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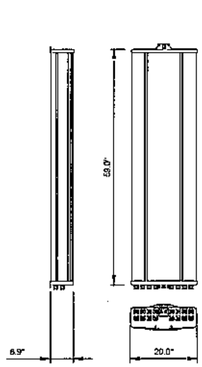
SITE# CTL01062
CHAPEL STREET
561 CHAPEL STREET
THOMASTON, CT 06787

EXISTING & PROPOSED ANTENNA LAYOUT

C-3

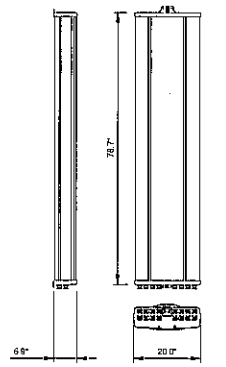
1 ANTENNA SPECIFICATIONS
SCALE: N.T.S.

MANUFACTURER:	KATHREIN
MODEL NO.:	800-10964
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	59.0" x 20.0" x 6.9" 1499mm x 508mm x 175mm
WEIGHT (lbs):	94.8
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	254 LBF @ 93 MPH 1130 N @ 150 KM/H
SIDE WIND LOAD:	256 LBF @ 93 MPH 1140 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)



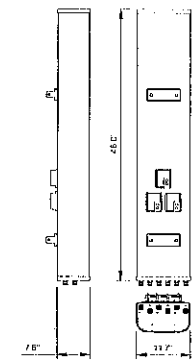
2 ANTENNA SPECIFICATIONS
SCALE: N.T.S.

MANUFACTURER:	KATHREIN
MODEL NO.:	800-10965
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	78.7" x 20.0" x 6.9" 1999mm x 508mm x 175mm
WEIGHT (lbs):	97.6
CONNECTOR:	16 x 4.3-10 FEMALE
FRONT WIND LOAD:	254 LBF @ 93 MPH 1130 N @ 150 KM/H
SIDE WIND LOAD:	256 LBF @ 93 MPH 1140 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)



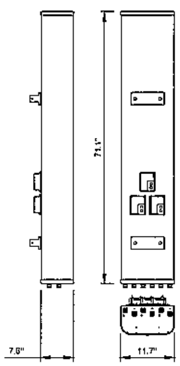
3 ANTENNA SPECIFICATIONS
SCALE: N.T.S.

MANUFACTURER	CCI
MODEL NO	HPA-65R-BU4AA
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	48" x 11.7" x 7.6" 1219mm x 297mm x 193mm
WEIGHT (lbs):	48.7 LBS
CONNECTOR:	6 x 4.3-10 FEMALE
FRONT WIND LOAD	127 LBS @ 100 MPH 564N @ 161 KPH
SIDE WIND LOAD	89 LBS @ 100 MPH 395N @ 161 KPH
WIND SPEED MAX.	150MPH (241 KPH)



4 ANTENNA SPECIFICATIONS
SCALE: N.T.S.

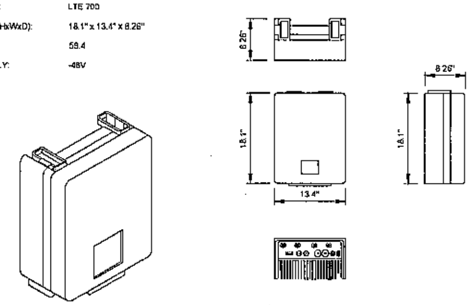
MANUFACTURER:	CCI
MODEL NO.:	HPA-65R-BU6AA
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	71.1" x 11.7" x 7.6" 1807mm x 297mm x 193mm
WEIGHT (lbs):	41.9 LBS
CONNECTOR:	6 x 4.3-10 FEMALE
FRONT WIND LOAD:	201 LBS @ 100 MPH 894N @ 161 KPH
SIDE WIND LOAD:	142 LBS @ 100 MPH 633N @ 161 KPH
WIND SPEED MAX.:	150MPH (241 KPH)



5 RRUS SPECIFICATIONS
SCALE: N.T.S.

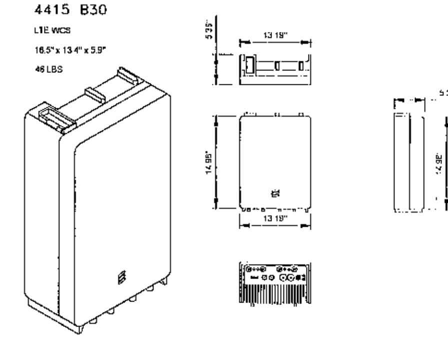
MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-4478 B14
TECHNOLOGY:	LTE 700
DIMENSIONS (HxWxD):	18.1" x 13.4" x 8.26"
WEIGHT (lbs):	59.4
POWER SUPPLY:	-48V

NOTE:
PENDING FINAL PRODUCT SPECIFICATION



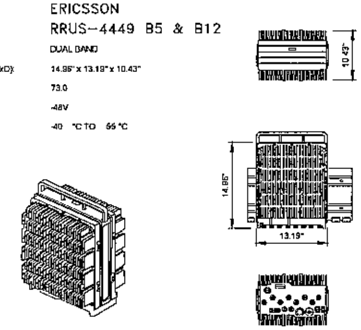
6 RRUS SPECIFICATIONS
SCALE: N.T.S.

MANUFACTURER	ERICSSON
MODEL NO.	4415 B30
TECHNOLOGY:	LTE WCS
DIMENSIONS (HxWxD)	16.5" x 13.4" x 5.9"
WEIGHT (lbs)	46 LBS



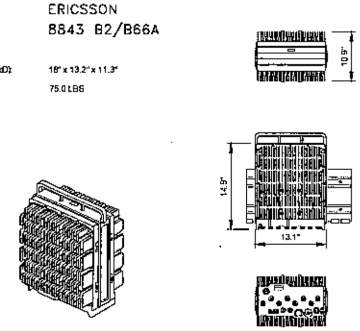
7 RRUS SPECIFICATIONS
SCALE: N.T.S.

MANUFACTURER:	ERICSSON
MODEL NO:	RRUS-4449 B5 & B12
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	14.96" x 13.19" x 10.43"
WEIGHT (lbs):	73.0
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C



8 RRUS SPECIFICATIONS
SCALE: N.T.S.

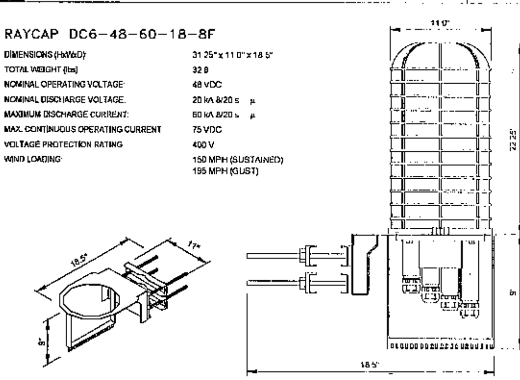
MANUFACTURER:	ERICSSON
MODEL NO:	8843 B2/B66A
DIMENSIONS (HxWxD):	18" x 13.2" x 11.3"
WEIGHT (lbs):	75.0 LBS



9 DC SURGE PROTECTION SPECIFICATIONS
SCALE: N.T.S.

RAYCAP DC6-48-60-18-8F

DIMENSIONS (HxWxD):	31.25" x 11.0" x 18.5"
TOTAL WEIGHT (lbs)	32.8
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 s μ
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 s μ
MAX. CONTINUOUS OPERATING CURRENT	75 VDC
VOLTAGE PROTECTION RATING	400 V
WIND LOADING:	150 MPH (SUSTAINED) 195 MPH (GUST)



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STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERCC004
DRAWN BY	JB
CHECKED BY	CAT

SUBMITTALS

1	01/08/19	FOR CONSTRUCTION
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FA# 10107966
SITE# CTL01062
CHAPEL STREET

580 CHAPEL STREET
THOMASTON, CT 06787

EQUIPMENT DETAILS I

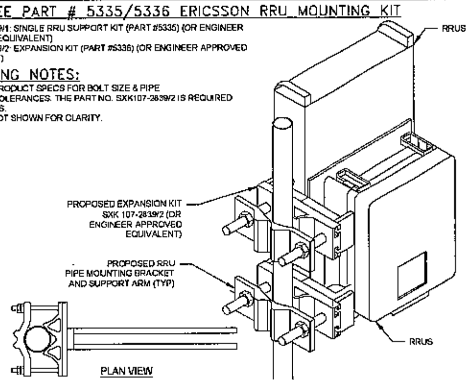
C-4

CUE DEE PART # 5335/5336 ERICSSON RRU MOUNTING KIT

SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART #5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART #5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:

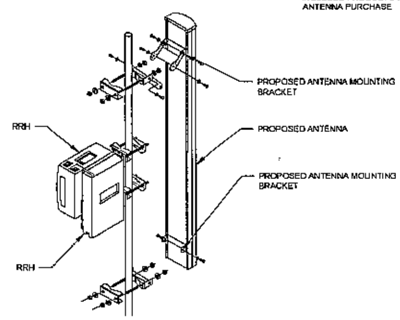
REFER TO PRODUCT SPECS FOR BOLT SIZE & PIPE DIAMETER TOLERANCES. THE PART NO. SXK107-2839/2 IS REQUIRED FOR (2) RRUS.
ANTENNA NOT SHOWN FOR CLARITY.



1 RRU MOUNTING DETAIL — SCALE: N.T.S.

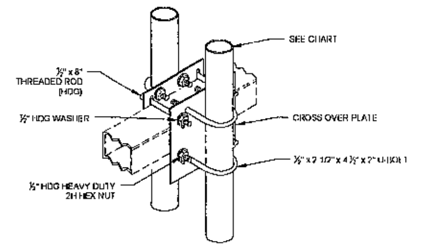
NOTE

MOUNTING OPTIONS ARE INCLUDED PRODUCTS WITH ANTENNA PURCHASE



2 ANTENNA MOUNTING DETAIL — SCALE: N.T.S.

PART #	PIPE SIZE	STAND OFF ARM
BBPM-K1	2-3/8"	3-1/2" - 4-1/2"
BBPM-K2	2-7/8"	3-1/2" - 4-1/2"
BBPM-K3	2-3/8"	3-1/2" - 6"
BBPM-U	2-3/8" - 4-1/2"	2-3/8" - 4-1/2"



3 DC6 MOUNTING DETAIL — SCALE: N.T.S.

DETAIL NOT USED

DETAIL NOT USED

DETAIL NOT USED

DETAIL NOT USED

DETAIL NOT USED

DETAIL NOT USED

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STATE OF CONNECTICUT
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO	ERCC0004
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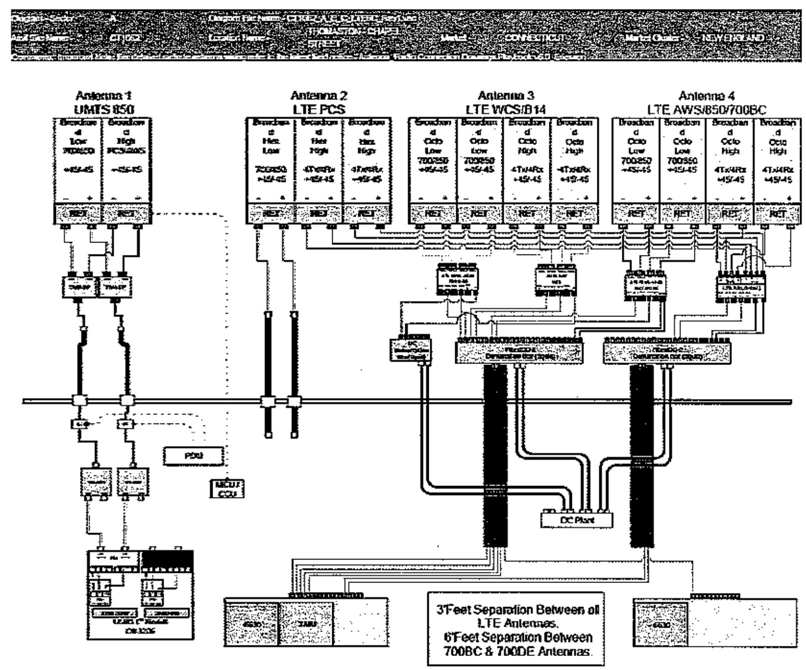
EQUIPMENT DETAILS II

C-5

ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's & DIPLEXERS	RRH's	FEEDER	RAYCAP
A1	7770 (55"x11"x5")	UMTS	30°	143'	(2) LGP 21401	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	(1) DC6-48-60-18-8F
A2	HPA-65R-BU6AA (71"x11.7"x7.6")	LTE	30°	143'	-	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	(2) DC6-48-60-18-8F
A3	800-10965 (78.7"x20"x6.9")	LTE	30°	143'	-	(1) 4478 B14 (700 LTE) (1) 4415 B30 (WCS)	(4) DC TRUNKS (1) FIBER TRUNK (LENGTH @ 170')	
A4	800-10966 (78.7"x20"x6.9")	LTE	30°	143'	-	(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (AWS/PCS)	-	
B1	7770 (55"x11"x5")	UMTS	150°	143'	(2) LGP 21401	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	
B2	HPA-65R-BU4AA (48"x11.7"x7.6")	LTE	150°	143'	-	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	
B3	800-10964 (59"x20"x6.9")	LTE	150°	143'	-	(1) 4478 B14 (700 LTE) (1) 4415 B30 (WCS)	-	
B4	800-10964 (59"x20"x6.9")	LTE	150°	143'	-	(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (AWS/PCS)	-	
G1	7770 (55"x11"x5")	UMTS	270°	143'	(2) LGP 21401	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	
G2	HPA-65R-BU6AA (71"x11.7"x7.6")	LTE	270°	143'	-	-	(2) 1-5/8" EXISTING (LENGTH @ 170')	
G3	800-10965 (78.7"x20"x6.9")	LTE	270°	143'	-	(1) 4478 B14 (700 LTE) (1) 4415 B30 (WCS)	-	
G4	800-10965 (78.7"x20"x6.9")	LTE	270°	143'	-	(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (AWS/PCS)	-	

*EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED

1 ANTENNA INFORMATION CHART — SCALE: NONE



2 RF EQUIPMENT SCHEMATIC — SCALE: NONE

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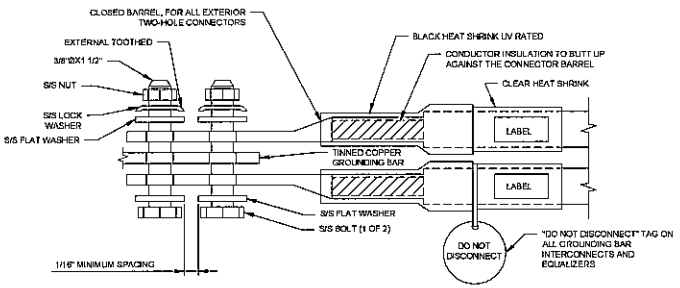
ANTENNA CHART & RF EQUIPMENT SCHEMATIC

RF-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE " THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("F", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL — SCALE: NONE

GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

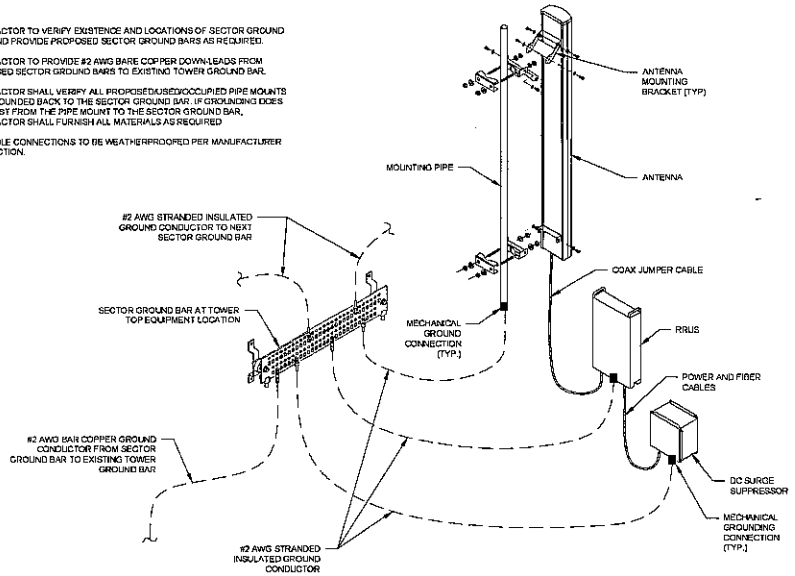
GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUNDING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR; LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351548. INSTALL PER MANUFACTURER GUIDELINES
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2' OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PREVENT INSTABILITY USING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 8' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND LEADS)
13. CONTRACTOR SHALL REPAIR/REPLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

2 GROUNDING NOTES — SCALE: NONE

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



3 TYPICAL ANTENNA GROUNDING SCHEMATIC — SCALE: NONE

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PROFESSIONAL ENGINEER — No. 0029052 — LICENSED

PROJECT NO	ERCD0004
DRAWN BY	JB
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SUBMITTALS

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FA# 10107956
SITE# CTL01062
CHAPEL STREET

580 CHAPEL STREET
THOMASTON, CT 06787

GROUNDING DETAILS

G-1

Date: **December 13, 2018**

Heather Simeone
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-8145

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10107966
	Carrier Site Name:	CTL01062
Crown Castle Designation:	**Crown Castle BU Number:**	823530
	Crown Castle Site Name:	CT364/Chapel St.
Monopole		
	Crown Castle JDE Job Number:	548514
	Crown Castle Work Order Number:	1669286
	Crown Castle Order Number:	471611 Rev. 0
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	400087
Site Data:	**580 Chapel Street, Thomaston, Litchfield County, CT** **Latitude *41° 39' 48.48"*, Longitude *-73° 4' 27.41"*** **175 Foot - Monopole Tower**	

Dear Heather Simeone,

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Neeraj Jog

Respectfully submitted by:

Joshua J. Riley, P.E.

Professional Engineer

Riley, Joshua J Dec 13 2018 9:45 AM

12/13/2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 175 ft Monopole tower designed by PiRod Manufactures Inc.

2) ANALYSIS CRITERIA

Building Code:	2018 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.500 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
142.0	143.0	1	cci antennas	HPA65R-BU4A w/ Mount Pipe	12 2 6	1 5/8 3/8 3/4
		2	cci antennas	HPA65R-BU6A w/ Mount Pipe		
		3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		2	kathrein	80010964 w/ Mount Pipe		
		4	kathrein	80010965 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		2	raycap	DC6-48-60-18-8F		
	142.0	1	cci tower mounts	Miscellaneous [NA 507-1]		
		1	crown mounts	Platform Mount [LP 303-1]		
		1	raycap	DC6-48-60-18-8F		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
172.0	175.0	2	andrew	VHLP2.6	12 3	1 5/8 7/8
	172.0	1	andrew	ATJB200-A01-007		
		2	andrew	ETW190VS12UB		
		1	cci tower mounts	Platform Mount [LP 701-1]		
		3	commscope	ATBT-BOTTOM-24V		
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ems wireless	RR90-17-02DP w/ Mount Pipe		
	168.0	1	bird technologies group	OA20-67-DIN		
		1	lone star electronics	LS-230C		
168.0	171.0	1	lone star electronics	LS-230C	6	7/8
	168.0	1	cci tower mounts	Side Arm Mount [SO 701-1]		
162.0	162.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	4	1 1/4
		3	alcatel lucent	PCS 1900MHz 2x40W		
		3	alcatel lucent	TD-RRH8x20-25		
		1	cci tower mounts	Platform Mount [LP 712-1]		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
152.0	152.0	6	antel	LPA-80080/4CF w/ Mount Pipe	6 1	1 5/8 1 3/8
		1	cci tower mounts	Sector Mount [SM 801-3]		
		6	commscope	NNHH-65B-R4 w/ Mount Pipe		
		1	raycap	RVZDC-6600-PF-48		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
115.0	115.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1 5/8
50.0	50.0	1	cci tower mounts	Side Arm Mount [SO 701-1]	1	1/2
		1	pctel	GPS-TMG-HR-26NCM		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	3462674	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod, Inc.	3464631	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod, Inc.	3462695	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading, tower/foundation details, and geotechnical data. The loading on the structure is based on CAD level drawings and carrier orders provided by the owner. If any of this information is not current and correct, this report should be considered obsolete and further analysis will be required.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	175 - 164.25	Pole	TP26x22x0.25	1	-4.15	1512.93	4.3	Pass
L2	164.25 - 129.67	Pole	TP34.0625x24.4135x0.3125	2	-17.94	2472.98	30.9	Pass
L3	129.67 - 96	Pole	TP41.75x32.452x0.375	3	-26.07	3620.12	42.9	Pass
L4	96 - 63.17	Pole	TP49.0625x39.8421x0.375	4	-35.67	4051.65	54.2	Pass
L5	63.17 - 31.17	Pole	TP56.125x46.9602x0.375	5	-46.67	4409.30	62.1	Pass
L6	31.17 - 0	Pole	TP62.9375x53.8475x0.375	6	-60.95	4763.53	69.3	Pass
							Summary	
						Pole (L6)	69.3	Pass
						Rating =	69.3	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	62.6	Pass
1, 2	Base Plate	0	-	Pass
1	Base Foundation	0	66.6	Pass
1	Base Foundation Soil Interaction	0	65.4	Pass

Structure Rating (max from all components) =	69.3%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed. Rating per TIA-222-H Section 15.5.
2) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

4.1) Recommendations

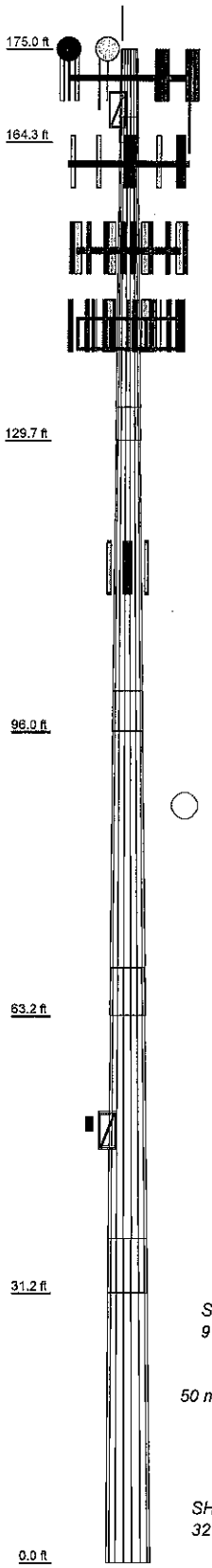
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6
Length (ft)	10.75	37.50	37.50	37.50	37.50	37.42
Number of Sides	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.3750	0.3750	0.3750
Socket Length (ft)	2.92	3.83	4.67	5.50	6.25	
Top Dia (in)	22.0000	24.4135	32.4520	39.8421	46.9602	53.8475
Bot Dia (in)	26.0000	34.0625	41.7500	49.0625	56.1250	62.9375
Grade	A572-65					
Weight (K)	0.7	3.7	5.6	6.7	7.8	8.8

Total Weight: 33.2 K



ALL REACTIONS ARE FACTORED

AXIAL 95 K

SHEAR 9 K — *MOMENT 1170 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 1.2750 in ICE

AXIAL 61 K

SHEAR 32 K — *MOMENT 4172 kip-ft*

TORQUE 1 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S.
9. TOWER RATING: 69.3%

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Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-2984
FAX: (913) 458-8136

Job: *CT364/Chapel St. Monopole (BU# 823530)*			
Project: *400087 (823530.1669286)*			
Client: Crown Castle	Drawn by: Josh Riley	App'd:	
Code: TIA-222-H	Date: 12/13/18	Scale: NTS	
Path: C:\Users\bl168982\OneDrive - Black & Veatch\Desktop\6\823530.1669286 Structural Analysis.en		Dwg No. E-	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Litchfield County, Connecticut.
2) Tower base elevation above sea level: 543.00 ft.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height 0.00 ft.
9) Nominal ice thickness of 1.2750 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) TIA-222-H Annex S..
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.05.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	175.00-164.25	10.75	2.92	18	22.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.67	37.50	3.83	18	24.4135	34.0625	0.3125	1.2500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	129.67-96.00	37.50	4.67	18	32.4520	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	96.00-63.17	37.50	5.50	18	39.8421	49.0625	0.3750	1.5000	A572-65 (65 ksi)
L5	63.17-31.17	37.50	6.25	18	46.9602	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	31.17-0.00	37.42		18	53.8475	62.9375	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3008	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	26.3625	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	25.5048	23.9052	1754.2801	8.5559	12.4021	141.4508	3510.8685	11.9549	3.7468	11.99
	34.5398	33.4758	4817.4335	11.9812	17.3038	278.4040	9641.2058	16.7411	5.4450	17.424
L3	33.8591	38.1797	4963.1505	11.3873	16.4856	301.0593	9932.8316	19.0935	5.0516	13.471
	42.3362	49.2466	10650.982 2	14.6881	21.2090	502.1916	21315.979 3	24.6280	6.6880	17.835
L4	41.5648	46.9757	9244.4482	14.0108	20.2398	456.7464	18501.060 4	23.4923	6.3522	16.939
	49.7615	57.9503	17355.137 8	17.2841	24.9238	696.3293	34733.111 9	28.9807	7.9750	21.267
L5	48.9917	55.4480	15202.631 8	16.5377	23.8558	637.2728	30425.267 7	27.7293	7.6050	20.28
	56.9330	66.3564	26056.150 6	19.7913	28.5115	913.8821	52146.586 5	33.1845	9.2180	24.581
L6	56.1620	63.6457	22991.526 9	18.9827	27.3545	840.5012	46013.306 6	31.8289	8.8172	23.512
	63.8506	74.4650	36822.894 6	22.2097	31.9722	1151.7142	73694.241 7	37.2396	10.4170	27.779

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 175.00-164.25				1	1	1			
L2 164.25-129.67				1	1	1			
L3 129.67-96.00				1	1	1			
L4 96.00-63.17				1	1	1			
L5 63.17-31.17				1	1	1			
L6 31.17-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	A	No	Surface Ar (CaAa)	175.00 - 8.00	1	1	0.000 0.000	0.0000		0.22
HB158-1-08U8-S8J18(1-5/8") ***	A	No	Surface Af (CaAa)	152.00 - 8.00	1	1	0.000 0.060	0.0000	3.9600	1.30

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A(1-5/8)	C	No	Surface Af (CaAa)	115.00 - 8.00	6	6	-0.050 0.183	0.0000	3.9600	0.82
***										
LDF4-50A(1/2)	C	No	Surface Af (CaAa)	50.00 - 8.00	1	1	-0.150 -0.090	0.0000	1.2500	0.15
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***									
AVA5-50(7/8")	A	No	No	Inside Pole	172.00 - 8.00	3	No Ice	0.00	0.30
							1/2" Ice	0.00	0.30
							1" Ice	0.00	0.30
							2" Ice	0.00	0.30
LDF7-50A(1-5/8")	A	No	No	Inside Pole	172.00 - 8.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									
LDF5-50A(7/8")	B	No	No	Inside Pole	168.00 - 8.00	6	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
***									
HB114-1-08U4-M5J(1-1/4")	C	No	No	Inside Pole	162.00 - 8.00	3	No Ice	0.00	1.08
							1/2" Ice	0.00	1.08
							1" Ice	0.00	1.08
							2" Ice	0.00	1.08
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	162.00 - 8.00	1	No Ice	0.00	1.22
							1/2" Ice	0.00	1.22
							1" Ice	0.00	1.22
							2" Ice	0.00	1.22
***									
LDF7-50A(1-5/8")	A	No	No	Inside Pole	152.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									
2" innerduct conduit	B	No	No	Inside Pole	142.00 - 8.00	2	No Ice	0.00	0.20
							1/2" Ice	0.00	0.20
							1" Ice	0.00	0.20
							2" Ice	0.00	0.20
AVA7-50(1-5/8)	B	No	No	Inside Pole	142.00 - 8.00	12	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	142.00 - 8.00	6	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
FB-L98-002-XXX(3/8")	B	No	No	Inside Pole	142.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
FB-L98B-034-XXX(3/8")	B	No	No	Inside Pole	142.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	175.00-164.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	164.25-129.67	A	0.000	0.000	0.000	0.000	0.52
		B	0.000	0.000	0.000	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.14
L3	129.67-96.00	A	0.000	0.000	0.000	0.000	0.58
		B	0.000	0.000	0.000	0.000	0.49
		C	0.000	0.000	0.000	0.000	0.24
L4	96.00-63.17	A	0.000	0.000	0.000	0.000	0.56
		B	0.000	0.000	0.000	0.000	0.47
		C	0.000	0.000	0.000	0.000	0.31
L5	63.17-31.17	A	0.000	0.000	0.000	0.000	0.55
		B	0.000	0.000	0.000	0.000	0.46
		C	0.000	0.000	0.000	0.000	0.30
L6	31.17-0.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	0.000	0.000	0.33
		C	0.000	0.000	0.000	0.000	0.22

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	175.00-164.25	A	1.502	0.000	0.000	3.229	0.000	0.12
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
L2	164.25-129.67	A	1.480	0.000	0.000	17.092	0.000	0.74
		B		0.000	0.000	0.000	0.000	0.22
		C		0.000	0.000	0.000	0.000	0.14
L3	129.67-96.00	A	1.441	0.000	0.000	19.928	0.000	0.85
		B		0.000	0.000	0.000	0.000	0.49
		C		0.000	0.000	0.000	0.000	0.35
L4	96.00-63.17	A	1.392	0.000	0.000	18.926	0.000	0.82
		B		0.000	0.000	0.000	0.000	0.47
		C		0.000	0.000	0.000	0.000	0.48
L5	63.17-31.17	A	1.321	0.000	0.000	17.816	0.000	0.79
		B		0.000	0.000	0.000	0.000	0.46
		C		0.000	0.000	5.242	0.000	0.53
L6	31.17-0.00	A	1.180	0.000	0.000	12.246	0.000	0.55
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	6.123	0.000	0.40

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	175.00-164.25	0.0000	0.0000	-1.0288	-0.5940
L2	164.25-129.67	0.0000	0.0000	-1.6935	-1.0942
L3	129.67-96.00	0.0000	0.0000	-1.9374	-1.2834
L4	96.00-63.17	0.0000	0.0000	-1.9075	-1.2636
L5	63.17-31.17	0.0000	0.0000	-1.5357	-0.6195
L6	31.17-0.00	0.0000	0.0000	-0.9741	-0.1633

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	164.25 - 175.00	1.0000	1.0000
L1	12	HB158-1-08U8-S8J18(1-5/8")	164.25 - 152.00	1.0000	1.0000
L2	1	Safety Line 3/8	129.67 - 164.25	1.0000	1.0000
L2	12	HB158-1-08U8-S8J18(1-5/8")	129.67 - 152.00	1.0000	1.0000
L2	20	LDF7-50A(1-5/8)	129.67 - 115.00	1.0000	1.0000
L3	1	Safety Line 3/8	96.00 - 129.67	1.0000	1.0000
L3	12	HB158-1-08U8-S8J18(1-5/8")	96.00 - 129.67	1.0000	1.0000
L3	20	LDF7-50A(1-5/8)	96.00 - 115.00	1.0000	1.0000
L4	1	Safety Line 3/8	63.17 - 96.00	1.0000	1.0000
L4	12	HB158-1-08U8-S8J18(1-5/8")	63.17 - 96.00	1.0000	1.0000
L4	20	LDF7-50A(1-5/8)	63.17 - 96.00	1.0000	1.0000
L4	22	LDF4-50A(1/2)	63.17 - 50.00	1.0000	1.0000
L5	1	Safety Line 3/8	31.17 - 63.17	1.0000	1.0000
L5	12	HB158-1-08U8-S8J18(1-5/8")	31.17 - 63.17	1.0000	1.0000
L5	20	LDF7-50A(1-5/8)	31.17 - 63.17	1.0000	1.0000
L5	22	LDF4-50A(1/2)	31.17 - 50.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8"x6'	C	From Leg	0.00 0.00 3.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.38 0.99 1.62 2.46	0.38 0.99 1.62 2.46	0.01 0.01 0.02 0.05
***									
Platform Mount [LP 701-1]	C	None		0.0000	172.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	59.15 71.12 83.09 107.03	59.15 71.12 83.09 107.03	2.75 3.42 4.10 5.45
4'x2" Mount Pipe	A	From Face	4.00 3.50 0.00	0.0000	172.00	No Ice 1/2" Ice	0.87 1.11 1.36	0.87 1.11 1.36	0.01 0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	1.90	1.90	0.06
						2" Ice			
4'x2" Mount Pipe	C	From Face	4.00 7.00 0.00	0.0000	172.00	No Ice	0.87	0.87	0.01
						1/2" Ice	1.11	1.11	0.02
						1" Ice	1.36	1.36	0.03
						2" Ice	1.90	1.90	0.06
RR90-17-02DP w/ Mount Pipe	A	From Face	4.00 -7.00 0.00	0.0000	172.00	No Ice	4.59	3.32	0.03
						1/2" Ice	5.02	4.09	0.07
						1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.22
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 -7.00 0.00	0.0000	172.00	No Ice	4.59	3.32	0.03
						1/2" Ice	5.02	4.09	0.07
						1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.22
RR90-17-02DP w/ Mount Pipe	C	From Face	4.00 -3.50 0.00	0.0000	172.00	No Ice	4.59	3.32	0.03
						1/2" Ice	5.02	4.09	0.07
						1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.22
LNX-6515DS-VTM w/ Mount Pipe	A	From Face	4.00 -3.50 0.00	0.0000	172.00	No Ice	11.71	9.86	0.08
						1/2" Ice	12.43	11.39	0.17
						1" Ice	13.16	12.94	0.27
						2" Ice	14.54	15.29	0.51
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice	11.71	9.86	0.08
						1/2" Ice	12.43	11.39	0.17
						1" Ice	13.16	12.94	0.27
						2" Ice	14.54	15.29	0.51
LNX-6515DS-VTM w/ Mount Pipe	C	From Face	4.00 -7.00 0.00	0.0000	172.00	No Ice	11.71	9.86	0.08
						1/2" Ice	12.43	11.39	0.17
						1" Ice	13.16	12.94	0.27
						2" Ice	14.54	15.29	0.51
OA20-67-DIN	C	From Face	4.00 -7.00 -4.00	0.0000	172.00	No Ice	2.00	2.00	0.01
						1/2" Ice	3.03	3.03	0.02
						1" Ice	4.06	4.06	0.03
						2" Ice	6.12	6.12	0.06
LS-230C	C	From Face	4.00 -7.00 -4.00	0.0000	172.00	No Ice	1.61	1.61	0.01
						1/2" Ice	2.34	2.34	0.02
						1" Ice	2.80	2.80	0.04
						2" Ice	3.68	3.68	0.09
ATBT-BOTTOM-24V	A	From Face	4.00 0.00 0.00	0.0000	172.00	No Ice	0.10	0.06	0.00
						1/2" Ice	0.15	0.10	0.00
						1" Ice	0.20	0.15	0.01
						2" Ice	0.32	0.26	0.01
ATBT-BOTTOM-24V	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice	0.10	0.06	0.00
						1/2" Ice	0.15	0.10	0.00
						1" Ice	0.20	0.15	0.01
						2" Ice	0.32	0.26	0.01
ATBT-BOTTOM-24V	C	From Face	4.00 0.00 0.00	0.0000	172.00	No Ice	0.10	0.06	0.00
						1/2" Ice	0.15	0.10	0.00
						1" Ice	0.20	0.15	0.01
						2" Ice	0.32	0.26	0.01
ETW190VS12UB	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice	0.57	0.32	0.01
						1/2" Ice	0.67	0.40	0.02
						1" Ice	0.77	0.48	0.03
						1" Ice	1.00	0.68	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
ETW190VS12UB	C	From Face	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.57 0.67 0.77 1.00	0.32 0.40 0.48 0.68	0.01 0.02 0.03 0.04
ATJB200-A01-007	A	From Face	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.38 0.46 0.54 0.74	0.13 0.18 0.24 0.39	0.00 0.01 0.01 0.02
***									
Side Arm Mount [SO 701-1]	A	From Face	0.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
LS-230C	A	From Face	3.00 0.00 3.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.61 2.34 2.80 3.68	1.61 2.34 2.80 3.68	0.01 0.02 0.04 0.09
***									
Platform Mount [LP 712-1]	C	None		0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	24.53 29.94 35.35 46.17	24.53 29.94 35.35 46.17	1.34 1.65 1.96 2.58
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
APXVTM14-C-120 w/ Mount Pipe	A	From Face	3.00 -6.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Face	3.00 -6.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	C	From Face	3.00 -6.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
TD-RRH8x20-25	A	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	B	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	5.10	2.30	0.20
							2" Ice			
TD-RRH8x20-25	C	From Face	3.00	0.0000		162.00	No Ice	4.05	1.53	0.07
			0.00				1/2"	4.30	1.71	0.10
			0.00				Ice	4.56	1.90	0.13
							1" Ice	5.10	2.30	0.20
							2" Ice			
800MHz 2X50W RRH W/FILTER	A	From Face	0.50	0.0000		162.00	No Ice	2.06	1.93	0.06
			0.00				1/2"	2.24	2.11	0.09
			0.00				Ice	2.43	2.29	0.11
							1" Ice	2.83	2.68	0.17
							2" Ice			
800MHz 2X50W RRH W/FILTER	B	From Face	0.50	0.0000		162.00	No Ice	2.06	1.93	0.06
			0.00				1/2"	2.24	2.11	0.09
			0.00				Ice	2.43	2.29	0.11
							1" Ice	2.83	2.68	0.17
							2" Ice			
800MHz 2X50W RRH W/FILTER	C	From Face	0.50	0.0000		162.00	No Ice	2.06	1.93	0.06
			0.00				1/2"	2.24	2.11	0.09
			0.00				Ice	2.43	2.29	0.11
							1" Ice	2.83	2.68	0.17
							2" Ice			
PCS 1900MHz 2x40W	A	From Face	0.50	0.0000		162.00	No Ice	2.35	1.28	0.04
			0.00				1/2"	2.55	1.43	0.06
			0.00				Ice	2.75	1.60	0.08
							1" Ice	3.18	1.95	0.14
							2" Ice			
PCS 1900MHz 2x40W	B	From Face	0.50	0.0000		162.00	No Ice	2.35	1.28	0.04
			0.00				1/2"	2.55	1.43	0.06
			0.00				Ice	2.75	1.60	0.08
							1" Ice	3.18	1.95	0.14
							2" Ice			
PCS 1900MHz 2x40W	C	From Face	0.50	0.0000		162.00	No Ice	2.35	1.28	0.04
			0.00				1/2"	2.55	1.43	0.06
			0.00				Ice	2.75	1.60	0.08
							1" Ice	3.18	1.95	0.14
							2" Ice			
6'x2" Mount Pipe	A	From Face	3.00	0.0000		162.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
6'x2" Mount Pipe	B	From Face	3.00	0.0000		162.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
6'x2" Mount Pipe	C	From Face	3.00	0.0000		162.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
4'x2" Mount Pipe	A	From Face	0.50	0.0000		162.00	No Ice	0.87	0.87	0.01
			0.00				1/2"	1.11	1.11	0.02
			0.00				Ice	1.36	1.36	0.03
							1" Ice	1.90	1.90	0.06
							2" Ice			
4'x2" Mount Pipe	B	From Face	0.50	0.0000		162.00	No Ice	0.87	0.87	0.01
			0.00				1/2"	1.11	1.11	0.02
			0.00				Ice	1.36	1.36	0.03
							1" Ice	1.90	1.90	0.06
							2" Ice			
4'x2" Mount Pipe	C	From Face	0.50	0.0000		162.00	No Ice	0.87	0.87	0.01
			0.00				1/2"	1.11	1.11	0.02
			0.00				Ice	1.36	1.36	0.03
							1" Ice	1.90	1.90	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**						2" Ice			
Sector Mount [SM 801-3]	C	None		0.0000	152.00	No Ice	20.40	20.40	0.88
						1/2" Ice	26.30	26.30	1.25
						1" Ice	32.20	32.20	1.63
						2" Ice	44.00	44.00	2.39
NNHH-65B-R4 w/ Mount Pipe	A	From Leg	3.00 -6.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						2" Ice	14.82	11.33	0.52
NNHH-65B-R4 w/ Mount Pipe	A	From Leg	3.00 -2.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						2" Ice	14.82	11.33	0.52
LPA-80080/4CF w/ Mount Pipe	A	From Leg	3.00 2.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
LPA-80080/4CF w/ Mount Pipe	A	From Leg	3.00 6.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
NNHH-65B-R4 w/ Mount Pipe	B	From Leg	3.00 -6.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						2" Ice	14.82	11.33	0.52
NNHH-65B-R4 w/ Mount Pipe	B	From Leg	3.00 -2.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						2" Ice	14.82	11.33	0.52
LPA-80080/4CF w/ Mount Pipe	B	From Leg	3.00 2.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
LPA-80080/4CF w/ Mount Pipe	B	From Leg	3.00 6.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
LPA-80080/4CF w/ Mount Pipe	C	From Leg	3.00 -6.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
LPA-80080/4CF w/ Mount Pipe	C	From Leg	3.00 -2.00 0.00	0.0000	152.00	No Ice	2.86	6.57	0.03
						1/2" Ice	3.22	7.19	0.08
						1" Ice	3.59	7.84	0.13
						2" Ice	4.34	9.17	0.25
NNHH-65B-R4 w/ Mount Pipe	C	From Leg	3.00 2.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						2" Ice	14.82	11.33	0.52
NNHH-65B-R4 w/ Mount Pipe	C	From Leg	3.00 6.00 0.00	0.0000	152.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						1" Ice	13.67	9.50	0.29
						1" Ice	14.82	11.33	0.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RFV01U-D2A	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
RFV01U-D2A	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
RFV01U-D2A	C	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
RFV01U-D1A	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
RFV01U-D1A	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
RFV01U-D1A	C	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
RVZDC-6600-PF-48	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.06 4.32 4.58 5.14	3.10 3.34 3.58 4.09	0.03 0.07 0.11 0.20
**									
Platform Mount [LP 303-1]	C	None		0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.66 18.87 23.08 31.50	14.66 18.87 23.08 31.50	1.25 1.48 1.71 2.18
Miscellaneous [NA 507-1]	C	None		0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 6.70 8.60 12.40	4.80 6.70 8.60 12.40	0.25 0.29 0.34 0.44
6'x2" Mount Pipe	A	From Face	3.00 -1.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Face	3.00 -1.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	3.00 -1.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	A	From Face	3.00 4.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
6'x2" Mount Pipe	B	From Face	3.00 4.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	3.00 4.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
5'x2" Mount Pipe	A	From Face	3.00 0.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
5'x2" Mount Pipe	B	From Face	3.00 0.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
5'x2" Mount Pipe	C	From Face	3.00 0.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
7770.00 w/ Mount Pipe	A	From Face	3.00 -6.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Face	3.00 -6.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Face	3.00 -6.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
HPA65R-BU6A w/ Mount Pipe	A	From Leg	3.00 -2.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.09 8.64 9.16 10.22	7.19 8.36 9.24 11.05	0.07 0.14 0.21 0.39
HPA65R-BU4A w/ Mount Pipe	B	From Leg	3.00 -2.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.20 5.58 5.97 6.79	4.66 5.27 5.89 7.18	0.05 0.10 0.15 0.28
HPA65R-BU6A w/ Mount Pipe	C	From Leg	3.00 -2.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.09 8.64 9.16 10.22	7.19 8.36 9.24 11.05	0.07 0.14 0.21 0.39
80010965 w/ Mount Pipe	A	From Leg	3.00 2.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.05 14.69 15.30 16.53	7.63 8.90 9.96 11.92	0.13 0.22 0.33 0.57
80010964 w/ Mount Pipe	B	From Leg	3.00 2.00 1.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice	10.23 10.74 11.24 12.25	5.51 6.37 7.12 8.64	0.11 0.18 0.26 0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
80010965 w/ Mount Pipe	C	From Leg	3.00	2.00	0.0000	142.00	No Ice	14.05	7.63	0.13
				1.00			1/2" Ice	14.69	8.90	0.22
							1" Ice	15.30	9.96	0.33
							2" Ice	16.53	11.92	0.57
80010965 w/ Mount Pipe	A	From Leg	3.00	6.00	0.0000	142.00	No Ice	14.05	7.63	0.13
				1.00			1/2" Ice	14.69	8.90	0.22
							1" Ice	15.30	9.96	0.33
							2" Ice	16.53	11.92	0.57
80010964 w/ Mount Pipe	B	From Leg	3.00	6.00	0.0000	142.00	No Ice	10.23	5.51	0.11
				1.00			1/2" Ice	10.74	6.37	0.18
							1" Ice	11.24	7.12	0.26
							2" Ice	12.25	8.64	0.45
80010965 w/ Mount Pipe	C	From Leg	3.00	6.00	0.0000	142.00	No Ice	14.05	7.63	0.13
				1.00			1/2" Ice	14.69	8.90	0.22
							1" Ice	15.30	9.96	0.33
							2" Ice	16.53	11.92	0.57
RADIO 4415 B30	A	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.64	0.64	0.04
				1.00			1/2" Ice	1.80	0.75	0.05
							1" Ice	1.97	0.87	0.07
							2" Ice	2.33	1.13	0.11
RADIO 4415 B30	B	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.64	0.64	0.04
				1.00			1/2" Ice	1.80	0.75	0.05
							1" Ice	1.97	0.87	0.07
							2" Ice	2.33	1.13	0.11
RADIO 4415 B30	C	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.64	0.64	0.04
				1.00			1/2" Ice	1.80	0.75	0.05
							1" Ice	1.97	0.87	0.07
							2" Ice	2.33	1.13	0.11
RRUS 4449 B5/B12	A	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.97	1.41	0.07
				1.00			1/2" Ice	2.14	1.56	0.09
							1" Ice	2.33	1.73	0.11
							2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	B	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.97	1.41	0.07
				1.00			1/2" Ice	2.14	1.56	0.09
							1" Ice	2.33	1.73	0.11
							2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	C	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.97	1.41	0.07
				1.00			1/2" Ice	2.14	1.56	0.09
							1" Ice	2.33	1.73	0.11
							2" Ice	2.72	2.07	0.16
RRUS 4478 B14	A	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.84	1.06	0.06
				1.00			1/2" Ice	2.01	1.20	0.08
							1" Ice	2.19	1.34	0.09
							2" Ice	2.57	1.66	0.14
RRUS 4478 B14	B	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.84	1.06	0.06
				1.00			1/2" Ice	2.01	1.20	0.08
							1" Ice	2.19	1.34	0.09
							2" Ice	2.57	1.66	0.14
RRUS 4478 B14	C	From Leg	3.00	0.00	0.0000	142.00	No Ice	1.84	1.06	0.06
				1.00			1/2" Ice	2.01	1.20	0.08
							1" Ice	2.19	1.34	0.09
							2" Ice	2.57	1.66	0.14
RRUS 8843 B2/B66A	A	From Leg	3.00		0.0000	142.00	No Ice	1.64	1.35	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2"	1.80	1.50	0.09
			1.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
RRUS 8843 B2/B66A	B	From Leg	3.00		0.0000	142.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			1.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
RRUS 8843 B2/B66A	C	From Leg	3.00		0.0000	142.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			1.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
(2) LGP21401	A	From Face	3.00		0.0000	142.00	No Ice	1.10	0.35	0.01
			0.00				1/2"	1.24	0.44	0.02
			1.00				Ice	1.38	0.54	0.03
							1" Ice	1.69	0.77	0.05
							2" Ice			
(2) LGP21401	B	From Face	3.00		0.0000	142.00	No Ice	1.10	0.35	0.01
			0.00				1/2"	1.24	0.44	0.02
			1.00				Ice	1.38	0.54	0.03
							1" Ice	1.69	0.77	0.05
							2" Ice			
(2) LGP21401	C	From Face	3.00		0.0000	142.00	No Ice	1.10	0.35	0.01
			0.00				1/2"	1.24	0.44	0.02
			1.00				Ice	1.38	0.54	0.03
							1" Ice	1.69	0.77	0.05
							2" Ice			
DC6-48-60-18-8F	A	From Leg	1.00		0.0000	142.00	No Ice	0.92	0.92	0.02
			0.00				1/2"	1.46	1.46	0.04
			1.00				Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice			
DC6-48-60-18-8F	B	From Leg	1.00		0.0000	142.00	No Ice	0.92	0.92	0.02
			0.00				1/2"	1.46	1.46	0.04
			1.00				Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice			
DC6-48-60-18-8F	C	From Face	1.00		0.0000	142.00	No Ice	0.92	0.92	0.02
			0.00				1/2"	1.46	1.46	0.04
			0.00				Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice			
***										
APXV18-206517S-C w/ Mount Pipe	A	From Face	1.00		0.0000	115.00	No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Face	1.00		0.0000	115.00	No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Face	1.00		0.0000	115.00	No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice			
**										
Side Arm Mount [SO 701-1]	A	From Face	0.50		0.0000	50.00	No Ice	0.85	1.67	0.07
			0.00				1/2"	1.14	2.34	0.08
			0.00				Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
GPS-TMG-HR-26NCM	A	From Face	3.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.13 0.18 0.24 0.37	0.13 0.18 0.24 0.37	0.00 0.00 0.01 0.01
*********									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.6	A	Paraboloid w/Shroud (HP)	From Face	4.00 3.50 3.00	-6.0000		172.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice	6.68 7.07 7.46 8.23	0.05 0.08 0.12 0.19
VHLP2.6	C	Paraboloid w/Shroud (HP)	From Face	4.00 7.00 3.00	90.0000		172.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice	6.68 7.07 7.46 8.23	0.05 0.08 0.12 0.19
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	175 - 164.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.02	-1.14	-4.63
			Max. Mx	8	-4.16	-29.56	-1.85
			Max. My	14	-4.19	-1.21	-28.14
			Max. Vy	8	5.94	-29.56	-1.85
			Max. Vx	14	5.64	-1.21	-28.14
			Max. Torque	7			-5.10
L2	164.25 - 129.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.88	1.04	-0.68
			Max. Mx	8	-17.95	-496.92	-6.97
			Max. My	2	-18.00	9.78	485.21
			Max. Vy	8	21.44	-496.92	-6.97
			Max. Vx	14	21.17	-7.80	-484.67
			Max. Torque	7			-4.78
L3	129.67 - 96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.13	1.51	-0.73
			Max. Mx	8	-26.07	-1254.55	-12.11
			Max. My	2	-26.11	16.41	1233.65
			Max. Vy	8	24.76	-1254.55	-12.11
			Max. Vx	14	24.49	-13.79	-1233.49
			Max. Torque	16			-1.16
L4	96 - 63.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.66	2.09	-1.07
			Max. Mx	8	-35.67	-2092.13	-17.27
			Max. My	14	-35.70	-19.55	-2062.74
			Max. Vy	8	27.52	-2092.13	-17.27
			Max. Vx	14	27.25	-19.55	-2062.74
			Max. Torque	16			-1.16
L5	63.17 - 31.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.87	2.99	-1.44
			Max. Mx	8	-46.67	-2992.41	-22.07
			Max. My	14	-46.68	-24.74	-2955.33
			Max. Vy	8	30.00	-2992.41	-22.07
			Max. Vx	14	29.75	-24.74	-2955.33
			Max. Torque	16			-1.30
L6	31.17 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-94.81	3.56	-2.09
			Max. Mx	8	-60.95	-4162.50	-27.47
			Max. My	14	-60.95	-30.76	-4116.65

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	32.47	-4162.50	-27.47
			Max. Vx	14	32.23	-30.76	-4116.65
			Max. Torque	16			-1.30

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	94.81	8.93	0.00
	Max. H_x	20	60.96	32.30	0.11
	Max. H_z	2	60.96	0.17	32.20
	Max. M_x	2	4114.57	0.17	32.20
	Max. M_z	8	4162.50	-32.45	-0.13
	Max. Torsion	6	1.08	-28.12	15.91
	Min. Vert	5	45.72	-16.20	27.79
	Min. H_x	9	45.72	-32.45	-0.13
	Min. H_z	15	45.72	-0.16	-32.20
	Min. M_x	14	-4116.65	-0.16	-32.20
	Min. M_z	20	-4139.71	32.30	0.11
	Min. Torsion	16	-1.30	16.17	-27.79

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	50.80	0.00	0.00	0.54	1.26	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	60.96	-0.17	-32.20	-4114.57	35.82	-1.06
0.9 Dead+1.0 Wind 0 deg - No Ice	45.72	-0.17	-32.20	-4063.05	34.87	-1.04
1.2 Dead+1.0 Wind 30 deg - No Ice	60.96	16.20	-27.79	-3543.66	-2074.87	-0.59
0.9 Dead+1.0 Wind 30 deg - No Ice	45.72	16.20	-27.79	-3499.36	-2049.17	-0.56
1.2 Dead+1.0 Wind 60 deg - No Ice	60.96	28.12	-15.91	-2019.93	-3607.06	-1.08
0.9 Dead+1.0 Wind 60 deg - No Ice	45.72	28.12	-15.91	-1994.81	-3562.05	-1.06
1.2 Dead+1.0 Wind 90 deg - No Ice	60.96	32.45	0.13	27.47	-4162.50	-0.99
0.9 Dead+1.0 Wind 90 deg - No Ice	45.72	32.45	0.13	26.89	-4110.49	-0.98
1.2 Dead+1.0 Wind 120 deg - No Ice	60.96	28.18	16.17	2074.31	-3620.06	-0.46
0.9 Dead+1.0 Wind 120 deg - No Ice	45.72	28.18	16.17	2048.05	-3574.85	-0.45
1.2 Dead+1.0 Wind 150 deg - No Ice	60.96	16.45	27.89	3566.54	-2124.39	0.06
0.9 Dead+1.0 Wind 150 deg - No Ice	45.72	16.45	27.89	3521.58	-2097.94	0.05
1.2 Dead+1.0 Wind 180 deg - No Ice	60.96	0.16	32.20	4116.65	-30.76	0.43
0.9 Dead+1.0 Wind 180 deg - No Ice	45.72	0.16	32.20	4064.77	-30.69	0.41
1.2 Dead+1.0 Wind 210 deg - No Ice	60.96	-16.17	27.79	3546.44	2072.38	1.30
0.9 Dead+1.0 Wind 210 deg - No Ice	45.72	-16.17	27.79	3501.78	2045.92	1.28
1.2 Dead+1.0 Wind 240 deg - No Ice	60.96	-27.99	15.93	2024.61	3587.15	1.28
0.9 Dead+1.0 Wind 240 deg	45.72	-27.99	15.93	1999.11	3541.63	1.25

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
- No Ice						
1.2 Dead+1.0 Wind 270 deg - No Ice	60.96	-32.30	-0.11	-22.41	4139.71	1.05
0.9 Dead+1.0 Wind 270 deg - No Ice	45.72	-32.30	-0.11	-22.22	4087.24	1.04
1.2 Dead+1.0 Wind 300 deg - No Ice	60.96	-28.04	-16.13	-2064.61	3598.18	0.52
0.9 Dead+1.0 Wind 300 deg - No Ice	45.72	-28.04	-16.13	-2038.81	3552.48	0.51
1.2 Dead+1.0 Wind 330 deg - No Ice	60.96	-16.33	-27.87	-3561.42	2105.66	-0.25
0.9 Dead+1.0 Wind 330 deg - No Ice	45.72	-16.33	-27.87	-3516.85	2078.68	-0.24
1.2 Dead+1.0 Ice+1.0 Temp	94.81	-0.00	0.00	2.09	3.56	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	94.81	-0.02	-8.91	-1158.34	7.78	-0.20
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	94.81	4.49	-7.71	-1000.38	-583.60	0.02
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	94.81	7.78	-4.43	-573.09	-1012.83	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	94.81	8.96	0.01	4.56	-1167.52	0.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	94.81	7.77	4.46	583.04	-1012.19	0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	94.81	4.51	7.71	1006.10	-588.28	0.12
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	94.81	0.01	8.91	1163.02	0.38	0.07
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	94.81	-4.49	7.71	1005.21	590.14	0.13
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	94.81	-7.75	4.44	578.32	1015.62	0.04
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	94.81	-8.93	-0.00	0.76	1169.68	-0.02
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	94.81	-7.74	-4.45	-576.71	1014.55	-0.09
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	94.81	-4.49	-7.71	-1000.76	591.32	-0.15
Dead+Wind 0 deg - Service	50.80	-0.04	-7.20	-913.23	8.92	-0.24
Dead+Wind 30 deg - Service	50.80	3.62	-6.22	-786.46	-459.74	-0.13
Dead+Wind 60 deg - Service	50.80	6.29	-3.56	-448.14	-799.96	-0.24
Dead+Wind 90 deg - Service	50.80	7.26	0.03	6.49	-923.32	-0.22
Dead+Wind 120 deg - Service	50.80	6.30	3.62	461.01	-802.87	-0.10
Dead+Wind 150 deg - Service	50.80	3.68	6.24	792.36	-470.73	0.01
Dead+Wind 180 deg - Service	50.80	0.04	7.20	914.50	-5.85	0.09
Dead+Wind 210 deg - Service	50.80	-3.62	6.22	787.88	461.14	0.29
Dead+Wind 240 deg - Service	50.80	-6.26	3.56	449.97	797.49	0.28
Dead+Wind 270 deg - Service	50.80	-7.23	-0.02	-4.57	920.20	0.24
Dead+Wind 300 deg - Service	50.80	-6.27	-3.61	-458.05	799.95	0.12
Dead+Wind 330 deg - Service	50.80	-3.65	-6.23	-790.42	468.53	-0.06

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-50.80	0.00	0.00	50.80	0.00	0.000%
2	-0.17	-60.96	-32.20	0.17	60.96	32.20	0.000%
3	-0.17	-45.72	-32.20	0.17	45.72	32.20	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
4	16.20	-60.96	-27.79	-16.20	60.96	27.79	0.000%
5	16.20	-45.72	-27.79	-16.20	45.72	27.79	0.000%
6	28.12	-60.96	-15.91	-28.12	60.96	15.91	0.000%
7	28.12	-45.72	-15.91	-28.12	45.72	15.91	0.000%
8	32.45	-60.96	0.13	-32.45	60.96	-0.13	0.000%
9	32.45	-45.72	0.13	-32.45	45.72	-0.13	0.000%
10	28.18	-60.96	16.17	-28.18	60.96	-16.17	0.000%
11	28.18	-45.72	16.17	-28.18	45.72	-16.17	0.000%
12	16.45	-60.96	27.89	-16.45	60.96	-27.89	0.000%
13	16.45	-45.72	27.89	-16.45	45.72	-27.89	0.000%
14	0.16	-60.96	32.20	-0.16	60.96	-32.20	0.000%
15	0.16	-45.72	32.20	-0.16	45.72	-32.20	0.000%
16	-16.17	-60.96	27.79	16.17	60.96	-27.79	0.000%
17	-16.17	-45.72	27.79	16.17	45.72	-27.79	0.000%
18	-27.99	-60.96	15.93	27.99	60.96	-15.93	0.000%
19	-27.99	-45.72	15.93	27.99	45.72	-15.93	0.000%
20	-32.30	-60.96	-0.11	32.30	60.96	0.11	0.000%
21	-32.30	-45.72	-0.11	32.30	45.72	0.11	0.000%
22	-28.04	-60.96	-16.13	28.04	60.96	16.13	0.000%
23	-28.04	-45.72	-16.13	28.04	45.72	16.13	0.000%
24	-16.33	-60.96	-27.87	16.33	60.96	27.87	0.000%
25	-16.33	-45.72	-27.87	16.33	45.72	27.87	0.000%
26	0.00	-94.81	0.00	0.00	94.81	-0.00	0.000%
27	-0.02	-94.81	-8.91	0.02	94.81	8.91	0.000%
28	4.49	-94.81	-7.71	-4.49	94.81	7.71	0.000%
29	7.78	-94.81	-4.43	-7.78	94.81	4.43	0.000%
30	8.96	-94.81	0.01	-8.96	94.81	-0.01	0.000%
31	7.77	-94.81	4.46	-7.77	94.81	-4.46	0.000%
32	4.51	-94.81	7.71	-4.51	94.81	-7.71	0.000%
33	0.01	-94.81	8.91	-0.01	94.81	-8.91	0.000%
34	-4.49	-94.81	7.71	4.49	94.81	-7.71	0.000%
35	-7.75	-94.81	4.44	7.75	94.81	-4.44	0.000%
36	-8.93	-94.81	-0.00	8.93	94.81	0.00	0.000%
37	-7.74	-94.81	-4.45	7.74	94.81	4.45	0.000%
38	-4.49	-94.81	-7.71	4.49	94.81	7.71	0.000%
39	-0.04	-50.80	-7.20	0.04	50.80	7.20	0.000%
40	3.62	-50.80	-6.22	-3.62	50.80	6.22	0.000%
41	6.29	-50.80	-3.56	-6.29	50.80	3.56	0.000%
42	7.26	-50.80	0.03	-7.26	50.80	-0.03	0.000%
43	6.30	-50.80	3.62	-6.30	50.80	-3.62	0.000%
44	3.68	-50.80	6.24	-3.68	50.80	-6.24	0.000%
45	0.04	-50.80	7.20	-0.04	50.80	-7.20	0.000%
46	-3.62	-50.80	6.22	3.62	50.80	-6.22	0.000%
47	-6.26	-50.80	3.56	6.26	50.80	-3.56	0.000%
48	-7.23	-50.80	-0.02	7.23	50.80	0.02	0.000%
49	-6.27	-50.80	-3.61	6.27	50.80	3.61	0.000%
50	-3.65	-50.80	-6.23	3.65	50.80	6.23	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00011704
3	Yes	5	0.00000001	0.00005461
4	Yes	6	0.00000001	0.00013601
5	Yes	6	0.00000001	0.00004637
6	Yes	6	0.00000001	0.00013695
7	Yes	6	0.00000001	0.00004667
8	Yes	5	0.00000001	0.00007307
9	Yes	4	0.00000001	0.00080607
10	Yes	6	0.00000001	0.00014044
11	Yes	6	0.00000001	0.00004760
12	Yes	6	0.00000001	0.00014107
13	Yes	6	0.00000001	0.00004783
14	Yes	5	0.00000001	0.00006454

15	Yes	4	0.00000001	0.00070781
16	Yes	6	0.00000001	0.00013772
17	Yes	6	0.00000001	0.00004695
18	Yes	6	0.00000001	0.00013364
19	Yes	6	0.00000001	0.00004552
20	Yes	5	0.00000001	0.00010054
21	Yes	5	0.00000001	0.00004734
22	Yes	6	0.00000001	0.00013945
23	Yes	6	0.00000001	0.00004737
24	Yes	6	0.00000001	0.00014021
25	Yes	6	0.00000001	0.00004760
26	Yes	4	0.00000001	0.00000712
27	Yes	5	0.00000001	0.00086892
28	Yes	6	0.00000001	0.00012380
29	Yes	6	0.00000001	0.00012367
30	Yes	5	0.00000001	0.00087801
31	Yes	6	0.00000001	0.00012549
32	Yes	6	0.00000001	0.00012502
33	Yes	5	0.00000001	0.00087338
34	Yes	6	0.00000001	0.00012517
35	Yes	6	0.00000001	0.00012513
36	Yes	5	0.00000001	0.00087984
37	Yes	6	0.00000001	0.00012445
38	Yes	6	0.00000001	0.00012493
39	Yes	4	0.00000001	0.00013975
40	Yes	4	0.00000001	0.00057560
41	Yes	4	0.00000001	0.00058873
42	Yes	4	0.00000001	0.00013990
43	Yes	4	0.00000001	0.00059644
44	Yes	4	0.00000001	0.00059999
45	Yes	4	0.00000001	0.00012865
46	Yes	4	0.00000001	0.00059997
47	Yes	4	0.00000001	0.00055819
48	Yes	4	0.00000001	0.00014305
49	Yes	4	0.00000001	0.00059920
50	Yes	4	0.00000001	0.00060314

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 164.25	23.236	43	1.1238	0.0031
L2	167.17 - 129.67	21.395	43	1.1199	0.0019
L3	133.5 - 96	13.857	43	0.9826	0.0009
L4	100.67 - 63.17	7.840	43	0.7479	0.0005
L5	68.67 - 31.17	3.616	43	0.4966	0.0003
L6	37.42 - 0	1.084	43	0.2615	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.00	VHLP2.6	43	23.236	1.1238	0.0031	71097
172.00	Platform Mount [LP 701-1]	43	22.530	1.1231	0.0026	71097
168.00	Side Arm Mount [SO 701-1]	43	21.589	1.1208	0.0020	50895
162.00	Platform Mount [LP 712-1]	43	20.187	1.1114	0.0012	27766
152.00	Sector Mount [SM 801-3]	43	17.887	1.0798	0.0006	15860
142.00	Platform Mount [LP 303-1]	43	15.663	1.0322	0.0007	11100
115.00	APXV18-206517S-C w/ Mount Pipe	43	10.266	0.8564	0.0008	7876
50.00	Side Arm Mount [SO 701-1]	43	1.899	0.3540	0.0002	6798

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 164.25	104.826	10	5.0777	0.0134
L2	167.17 - 129.67	96.525	10	5.0610	0.0077
L3	133.5 - 96	62.518	10	4.4404	0.0038
L4	100.67 - 63.17	35.372	10	3.3780	0.0022
L5	68.67 - 31.17	16.312	10	2.2415	0.0012
L6	37.42 - 0	4.886	10	1.1795	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.00	VHLP2.6	10	104.826	5.0777	0.0134	16675
172.00	Platform Mount [LP 701-1]	10	101.642	5.0747	0.0111	16675
168.00	Side Arm Mount [SO 701-1]	10	97.403	5.0646	0.0083	11898
162.00	Platform Mount [LP 712-1]	10	91.078	5.0225	0.0051	6366
152.00	Sector Mount [SM 801-3]	10	80.704	4.8801	0.0024	3579
142.00	Platform Mount [LP 303-1]	10	70.670	4.6650	0.0027	2487
115.00	APXV18-206517S-C w/ Mount Pipe	10	46.317	3.8690	0.0036	1757
50.00	Side Arm Mount [SO 701-1]	10	8.564	1.5975	0.0008	1508

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	175 - 164.25 (1)	TP26x22x0.25	10.75	0.00	0.0	19.5705	-4.15	1440.89	0.003
L2	164.25 - 129.67 (2)	TP34.0625x24.4135x0.3125	37.50	0.00	0.0	32.4983	-17.94	2355.22	0.008
L3	129.67 - 96 (3)	TP41.75x32.452x0.375	37.50	0.00	0.0	47.8684	-26.07	3447.73	0.008
L4	96 - 63.17 (4)	TP49.0625x39.8421x0.375	37.50	0.00	0.0	56.3407	-35.67	3858.71	0.009
L5	63.17 - 31.17 (5)	TP56.125x46.9602x0.375	37.50	0.00	0.0	64.5384	-46.67	4199.33	0.011
L6	31.17 - 0 (6)	TP62.9375x53.8475x0.375	37.42	0.00	0.0	74.4650	-60.95	4536.70	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	175 - 164.25 (1)	TP26x22x0.25	30.40	729.12	0.042	0.00	729.12	0.000
L2	164.25 -	TP34.0625x24.4135x0.31	499.51	1584.18	0.315	0.00	1584.18	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	129.67 (2)	25						
L3	129.67 - 96 (3)	TP41.75x32.452x0.375	1258.93	2847.12	0.442	0.00	2847.12	0.000
L4	96 - 63.17 (4)	TP49.0625x39.8421x0.375	2098.34	3755.71	0.559	0.00	3755.71	0.000
L5	63.17 - 31.17 (5)	TP56.125x46.9602x0.375	3000.32	4686.62	0.640	0.00	4686.62	0.000
L6	31.17 - 0 (6)	TP62.9375x53.8475x0.375	4172.24	5847.24	0.714	0.00	5847.24	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	175 - 164.25 (1)	TP26x22x0.25	6.01	343.46	0.017	2.79	726.88	0.004
L2	164.25 - 129.67 (2)	TP34.0625x24.4135x0.3125	21.50	570.35	0.038	0.46	1605.45	0.000
L3	129.67 - 96 (3)	TP41.75x32.452x0.375	24.82	840.09	0.030	0.46	2903.88	0.000
L4	96 - 63.17 (4)	TP49.0625x39.8421x0.375	27.58	988.78	0.028	0.46	4034.18	0.000
L5	63.17 - 31.17 (5)	TP56.125x46.9602x0.375	30.04	1132.65	0.027	0.46	5304.28	0.000
L6	31.17 - 0 (6)	TP62.9375x53.8475x0.375	32.52	1306.86	0.025	0.46	7074.59	0.000

Pole Interaction Design Data

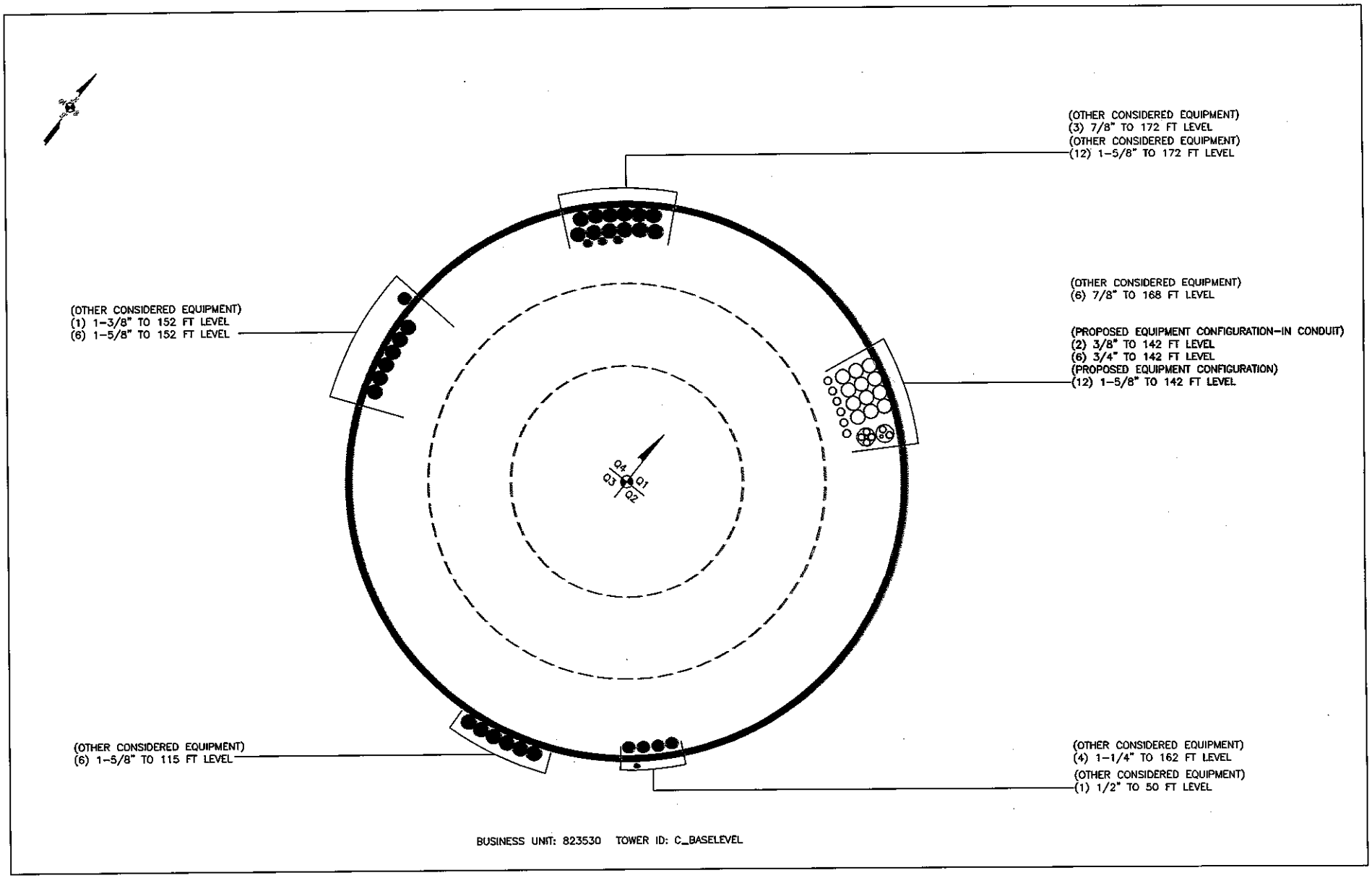
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	175 - 164.25 (1)	0.003	0.042	0.000	0.017	0.004	0.045	1.050	4.8.2
L2	164.25 - 129.67 (2)	0.008	0.315	0.000	0.038	0.000	0.324	1.050	4.8.2
L3	129.67 - 96 (3)	0.008	0.442	0.000	0.030	0.000	0.451	1.050	4.8.2
L4	96 - 63.17 (4)	0.009	0.559	0.000	0.028	0.000	0.569	1.050	4.8.2
L5	63.17 - 31.17 (5)	0.011	0.640	0.000	0.027	0.000	0.652	1.050	4.8.2
L6	31.17 - 0 (6)	0.013	0.714	0.000	0.025	0.000	0.728	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	175 - 164.25	Pole	TP26x22x0.25	1	-4.15	1512.93	4.3	Pass
L2	164.25 - 129.67	Pole	TP34.0625x24.4135x0.3125	2	-17.94	2472.98	30.9	Pass
L3	129.67 - 96	Pole	TP41.75x32.452x0.375	3	-26.07	3620.12	42.9	Pass
L4	96 - 63.17	Pole	TP49.0625x39.8421x0.375	4	-35.67	4051.65	54.2	Pass
L5	63.17 - 31.17	Pole	TP56.125x46.9602x0.375	5	-46.67	4409.30	62.1	Pass
L6	31.17 - 0	Pole	TP62.9375x53.8475x0.375	6	-60.95	4763.53	69.3	Pass
							Summary	
						Pole (L6)	69.3	Pass
						RATING =	**69.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(3) 7/8" TO 172 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-5/8" TO 172 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 7/8" TO 168 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION-IN CONDUIT)
(2) 3/8" TO 142 FT LEVEL
(6) 3/4" TO 142 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(12) 1-5/8" TO 142 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-3/8" TO 152 FT LEVEL
(6) 1-5/8" TO 152 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 115 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 162 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 50 FT LEVEL
Q1
Q2
Q3
Q4
BUSINESS UNIT: 823530 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

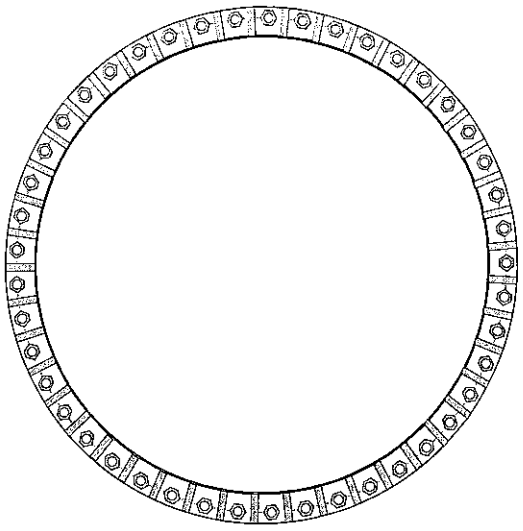
CROWN CASTLE

Site Info	
BU #	823530
Site Name	364/Chapel St. Monop
Order #	471611 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	4172.24
Axial Force (kips)	60.95
Shear Force (kips)	32.52

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(45) 1-1/4" ø bolts (Other N; Fy=105 ksi, Fu=150 ksi) on 68" BC

Base Plate Data

71" OD x 1.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

(45) 12"H x 4"W x 1"T, Notch: 0.5"
plate: Fy= 50 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.5" fillet
vert. weld: 0.25" fillet

Pole Data

62.9375" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 66.79	ϕPn_c = 101.75	**Stress Rating**
Vu = 0.72	ϕVn = 30.52	**62.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**

Stiffener Summary

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Pole Summary

Punching Shear:	**Pirod OK**

Pier and Pad Foundation

BU # :	823530
Site Name:	CT364/Chapel St. I
App. Number:	471611 Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	61	kips
Base Shear, Vu_comp:	32	kips
Moment, M_u:	4172	ft-kips
Tower Height, H:	175	ft
BP Dist. Above Fdn, bp_{dist}:	2.5	in

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	353.71	32.00	8.6%	Pass
Bearing Pressure (ksf)	22.50	3.56	15.8%	Pass
*Overturning (kip*ft)*	6802.20	4450.67	65.4%	Pass
*Pier Flexure (Comp.) (kip*ft)*	6225.42	4354.40	66.6%	Pass
Pier Compression (kip)	21089.12	106.33	0.5%	Pass
*Pad Flexure (kip*ft)*	2888.25	1859.18	61.3%	Pass
Pad Shear - 1-way (kips)	641.26	333.27	49.5%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	0.0%	Pass
*Flexural 2-way (Comp) (kip*ft)*	4012.99	2612.64	62.0%	Pass

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	65.4%
Structural Rating*:	66.6%

Pier Properties

Pier Shape:	Circular	
Pier Diameter, dpier:	7.5	ft
Ext. Above Grade, E:	0.5	ft
Pier Rebar Size, Sc:	9	
Pier Rebar Quantity, mc:	36	
Pier Tie/Spiral Size, St:	4	
Pier Tie/Spiral Quantity, mt:	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, D:	8	ft
Pad Width, W:	22.5	ft
Pad Thickness, T:	2.8	ft
Pad Rebar Size (Bottom), Sp:	9	
Pad Rebar Quantity (Bottom), mp:	23	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, Fy:	60000	psi
Concrete Compressive Strength, F'c:	3000	psi
Dry Concrete Density, δc:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	121	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, Cu:	0.000	ksf
Friction Angle, φ:	37	degrees
SPT Blow Count, N_{blows}:	30	
Base Friction, μ:	0.45	
Neglected Depth, N:	3.30	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw:	12	ft

<--Toggle between Gross and Net

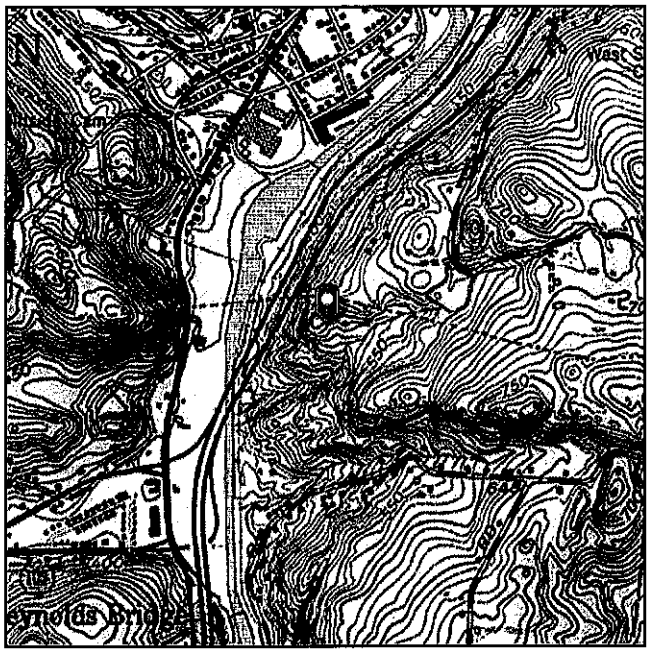
Version 3.1.0

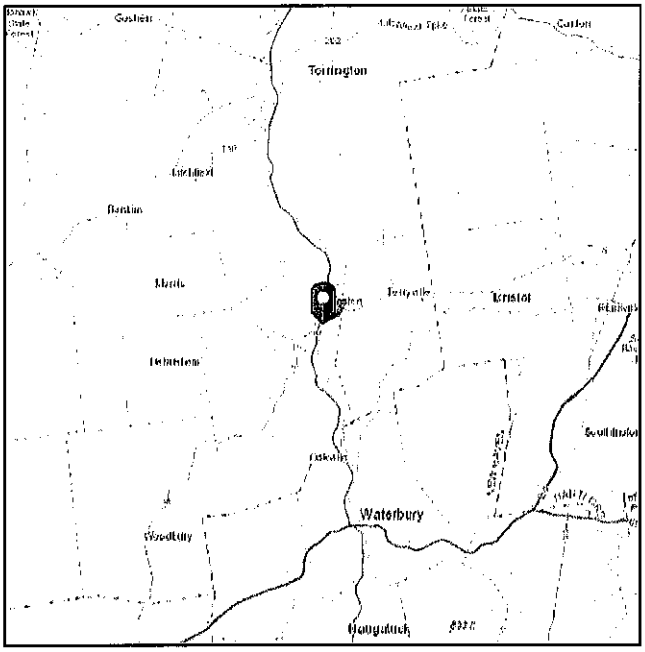
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 0 ft (NAVD 88)
Latitude: 41.663467
Longitude: -73.074281





Date Accessed: Tue Dec 11 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

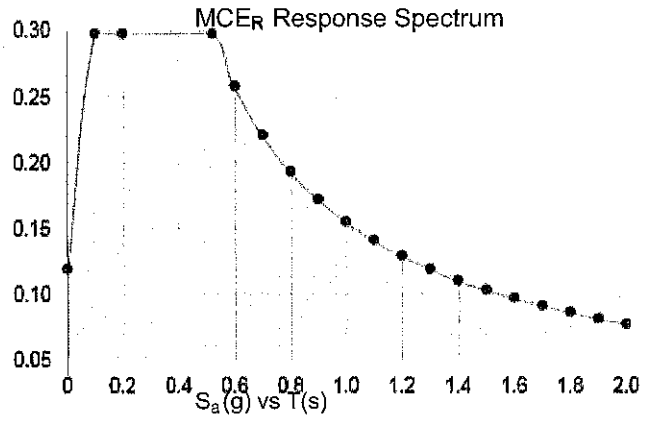
Seismic

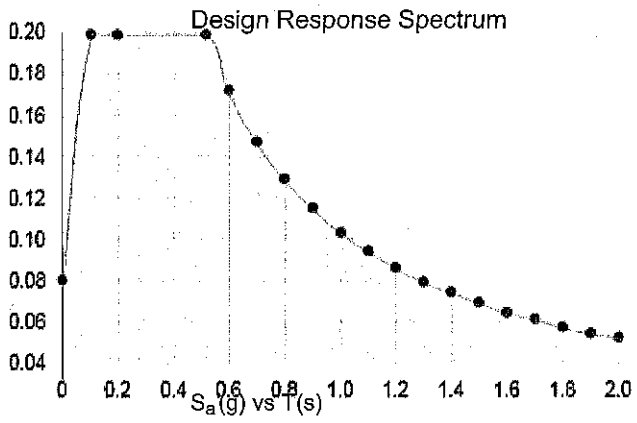
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.186	S_{DS} :	0.199
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.096
S_{MS} :	0.298	PGA_M :	0.153
S_{M1} :	0.155	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Dec 11 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Dec 11 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

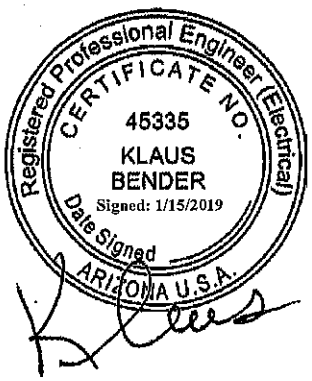
RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: CT364/Chapel St. Monopole
Crown Castle Site ID: 823530
AT&T Mobility, LLC FA #: 10107966
580 Chapel Street
Thomaston, CT
1/14/2019

Report Status:

AT&T Mobility, LLC Is Compliant



Klaus Bender
Registered Professional Engineer (Electrical)
Expires December 31, 2021

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive,
Suite 315

Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
Thomaston, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "CT364/Chapel St. Monopole" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That in addition to the emitters specified in the worksheet, there are additional collocated point-to-point microwave facilities on this structure and, the antennas used are highly directional oriented at angles at or just below the horizontal and, that the energy present at ground level is typically so low as to be considered insignificant and have not been included in this analysis; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for

licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.967% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 3.834% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Crown Castle
CT364/Chapel St. Monopole
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.164 %
AT&T Mobility, LLC (Proposed)	0.377 %
AT&T Mobility, LLC (Proposed)	0.302 %
AT&T Mobility, LLC (Proposed)	0.307 %
AT&T Mobility, LLC (Proposed)	0.198 %
AT&T Mobility, LLC (Proposed)	0.273 %
AT&T Mobility, LLC (Proposed)	0.346 %
Crown Castle (Decommissioned)	0 %
Sprint	0.408 %
Sprint	0.057 %
Sprint	0.231 %
T-Mobile	0.146 %
T-Mobile	0.101 %
Thomaston CT, Town of	0.013 %
Verizon Wireless	0.364 %
Verizon Wireless	0.178 %
Verizon Wireless	0.249 %
Verizon Wireless	0.119 %
Composite Site MPE:	3.834 %

AT&T Mobility, LLC
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	0.93145	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16437	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Powerwave	7770	143	30	1094	0.515497	0.09097	0.796846	0.14062
Powerwave	7770	143	150	1094	0.51484	0.090854	0.796846	0.14062
Powerwave	7770	143	270	1094	0.51484	0.090854	0.796846	0.14062

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.7736	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.37736	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	143	30	7114	1.507398	0.15074	3.605002	0.3605
Kathrein-Scala	800-10964	143	150	5274	1.145413	0.114541	2.672426	0.267243
Kathrein-Scala	800-10965	143	270	7114	1.545119	0.154512	3.605002	0.3605

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.01505	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.30151	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	143	30	6168	1.297139	0.129714	2.792729	0.279273
Kathrein-Scala	800-10964	143	150	5154	1.092579	0.109258	2.342057	0.234206
Kathrein-Scala	800-10965	143	270	6168	1.297139	0.129714	2.792729	0.279273

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	763	MHz
Maximum Permissible Exposure (MPE):	508.67	µW/cm^2
Maximum power density at ground level:	1.56169	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.30702	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	143	30	2959	1.14122	0.224355	1.454571	0.285958
Kathrein-Scala	800-10964	143	150	2209	0.872606	0.171548	1.204042	0.236705
Kathrein-Scala	800-10965	143	270	2959	1.14122	0.224355	1.454571	0.285958

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.9767	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.19767	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	143	30	3954	1.005296	0.10053	1.871767	0.187177
Kathrein-Scala	800-10964	143	150	3516	0.80801	0.080801	1.788592	0.178859
Kathrein-Scala	800-10965	143	270	3954	1.003718	0.100372	1.871767	0.187177

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.54879	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.27332	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	143	30	3607	1.066637	0.18823	1.112151	0.196262
Kathrein-Scala	800-10964	143	150	2631	0.747523	0.131916	0.914984	0.161468
Kathrein-Scala	800-10965	143	270	3607	1.066637	0.18823	1.112151	0.196262

AT&T Mobility, LLC (Proposed)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	1.70012	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.34602	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	HPA65R-BU6A	143	30	2819	1.069303	0.217633	1.094544	0.22277
CCI Antennas	HPA65R-BU4A	143	150	1946	1.631718	0.3321	1.688769	0.343711
CCI Antennas	HPA65R-BU6A	143	270	2819	1.069303	0.217633	1.094544	0.22277

Crown Castle (Decommissioned)
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	0	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-206517S	115	30	0	0	0	0	0
RFS	APXV18-206517S	115	150	0	0	0	0	0
RFS	APXV18-206517S	115	270	0	0	0	0	0

Sprint
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.08206	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.40821	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	162	340	3804	0.706127	0.070613	1.290771	0.129077
RFS	APXVSPP18-C-A20	162	340	3804	0.706127	0.070613	1.290771	0.129077
RFS	APXVSPP18-C-A20	162	90	3804	0.702969	0.070297	1.290771	0.129077
RFS	APXVSPP18-C-A20	162	90	3804	0.702969	0.070297	1.290771	0.129077
RFS	APXVSPP18-C-A20	162	200	3804	0.702969	0.070297	1.290771	0.129077
RFS	APXVSPP18-C-A20	162	200	3804	0.702969	0.070297	1.290771	0.129077

Sprint
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0.33004	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.05743	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	162	340	1084	0.293205	0.051022	0.298318	0.051912
RFS	APXVSPP18-C-A20	162	90	1084	0.292323	0.050868	0.298318	0.051912
RFS	APXVSPP18-C-A20	162	200	1084	0.292323	0.050868	0.298318	0.051912

Sprint
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.31194	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.23119	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVTM14-C-I20	162	340	6168	0.840008	0.084001	1.600068	0.160007
RFS	APXVTM14-C-I20	162	90	6168	0.840008	0.084001	1.600069	0.160007
RFS	APXVTM14-C-I20	162	200	6168	0.839501	0.08395	1.600068	0.160007

T-Mobile
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	700	MHz
Maximum Permissible Exposure (MPE):	466.67	µW/cm^2
Maximum power density at ground level:	0.68235	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.14622	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-6515DS-VTM	172	10	2109	0.381151	0.081675	0.386046	0.082724
ANDREW	LNX-6515DS-VTM	172	190	2109	0.381151	0.081675	0.386046	0.082724
ANDREW	LNX-6515DS-VTM	172	280	2109	0.381151	0.081675	0.386046	0.082724

T-Mobile
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.00986	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.10099	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
EMS	RR90-17-02DPL2	172	10	1653	0.391076	0.039108	0.582585	0.058259
EMS	RR90-17-02DPL2	172	190	1653	0.391076	0.039108	0.582585	0.058259
EMS	RR90-17-02DPL2	172	280	1653	0.391076	0.039108	0.582585	0.058259

Thomaston CT, Town of
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	450	MHz
Maximum Permissible Exposure (MPE):	300	µW/cm^2
Maximum power density at ground level:	0.03804	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.01268	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Lonestar	LS-230-C	168	0	100	0.038045	0.012682	0.038045	0.012682

Verizon Wireless
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	2.06222	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36392	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	LPA-80080-4CF	152	120	1423	0.630999	0.111353	0.65529	0.115639
Antel	LPA-80080-4CF	152	120	1423	0.630999	0.111353	0.65529	0.115639
Antel	LPA-80080-4CF	152	240	1423	0.630487	0.111262	0.65529	0.115639
Antel	LPA-80080-4CF	152	240	1423	0.630487	0.111262	0.65529	0.115639
Antel	LPA-80080-4CF	152	290	1423	0.630487	0.111262	0.65529	0.115639
Antel	LPA-80080-4CF	152	290	1423	0.630487	0.111262	0.65529	0.115639

Verizon Wireless
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.78338	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.17834	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNHH-65B-R4	152	40	3848	0.713997	0.0714	1.476289	0.147629
Commscope	NNHH-65B-R4	152	190	3848	0.712141	0.071214	1.476289	0.147629
Commscope	NNHH-65B-R4	152	290	3848	0.713997	0.0714	1.476289	0.147629

Verizon Wireless
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.49366	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.24937	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNHH-65B-R4	152	40	3591	1.298947	0.129895	2.34258	0.234258
Commscope	NNHH-65B-R4	152	190	3591	1.336585	0.133658	2.34258	0.234258
Commscope	NNHH-65B-R4	152	290	3591	1.298947	0.129895	2.34258	0.234258

Verizon Wireless
CT364/Chapel St. Monopole
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	0.59403	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.11865	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNHH-65B-R4	152	40	560	0.18481	0.036913	0.22437	0.044814
Commscope	NNHH-65B-R4	152	40	560	0.18481	0.036913	0.22437	0.044814
Commscope	NNHH-65B-R4	152	190	560	0.185282	0.037007	0.224371	0.044814
Commscope	NNHH-65B-R4	152	190	560	0.185282	0.037007	0.224371	0.044814
Commscope	NNHH-65B-R4	152	290	560	0.18481	0.036913	0.224371	0.044814
Commscope	NNHH-65B-R4	152	290	560	0.18481	0.036913	0.224371	0.044814

Date: **December 26, 2018**

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518-690-0790
structural@infinigy.com

Charles McGuirt
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Mobility Co-Locate**	
	Carrier Site Number:	10107966
	Carrier Site Name:	CTL01062
Crown Castle Designation:	**Crown Castle BU Number:**	823530
	Crown Castle Site Name:	CT364/Chapel St.
	Crown Castle JDE Job Number:	548514
	Crown Castle Order Number:	471611 Rev. 0
Engineering Firm Designation:	**Infinigy Report Designation:**	400087
Site Data:	**580 Chapel Street, Thomaston, Litchfield County, CT, 06787** **Latitude 41°39'48.48" Longitude -73°4'27.41"**	
Structure Information:	**Tower Height & Type:**	**175 ft Monopole**
	Mount Elevation:	**142 ft**
	Mount Type:	**14 ft Platform**

Dear Charles McGuirt,

Infinigy is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of AT&T's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

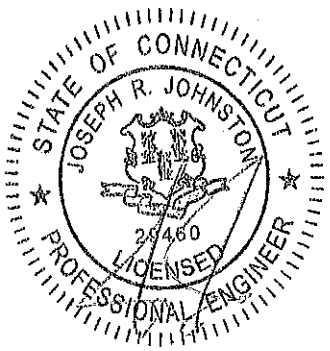
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient**

The analysis has been performed in accordance with the 2015 International Building Code/ 2018 Connecticut Building Code and TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 120 mph. Exposure Category B with Risk Category II was/were used in this analysis.

Mount analysis prepared by: Ishan Patel,
Respectfully Submitted by:

Joe Johnston, P.E.
VP Structural Engineering



12/26/18

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a existing Commscope MC-PK14L. This Mount is installed at 142 ft. elevation on 3 sectors of the 175 ft monopole.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Ice Thickness:	1.28 in
Wind Speed with Ice:	50 mph
Man Live Load at End-Points:	250 lb

Table 1 - Final Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Mount Type
142.0	142.0	1	CCI HPA65R-BU4A	Platform
		2	CCI HPA65R-BU6A	
		2	Kathrein 80010964	
		4	Kathrein 80010965	
		3	P/Wave 7770	
		3	Ericsson RRUS-4415 B30	
		3	Ericsson RRUS-4449 B5/B12	
		3	Ericsson RRUS 4478 B14	
		3	Ericsson RRUS 8843 B2/B66A	
		6	P/Wave LGP21401	
		3	Raycap DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	AT&T	471611, Rev. 0	CCI Sites
Reference Mount	MC-PK14L	Commscope	Commscope

3.1) Analysis Method

RISA-3D (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A53 (GR 35)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform)

Notes	Component	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe	142.0	84.1%	Pass
	Horizontal		34.6%	
	Stand-off		64.7%	
	Bolts		21.0%	

Structure Rating (max from all components) =	84.1%

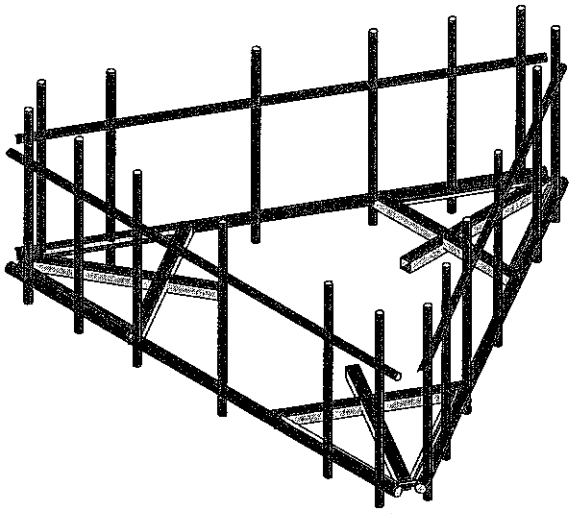
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

The Sector Frame Mount has sufficient capacity to support the proposed loading. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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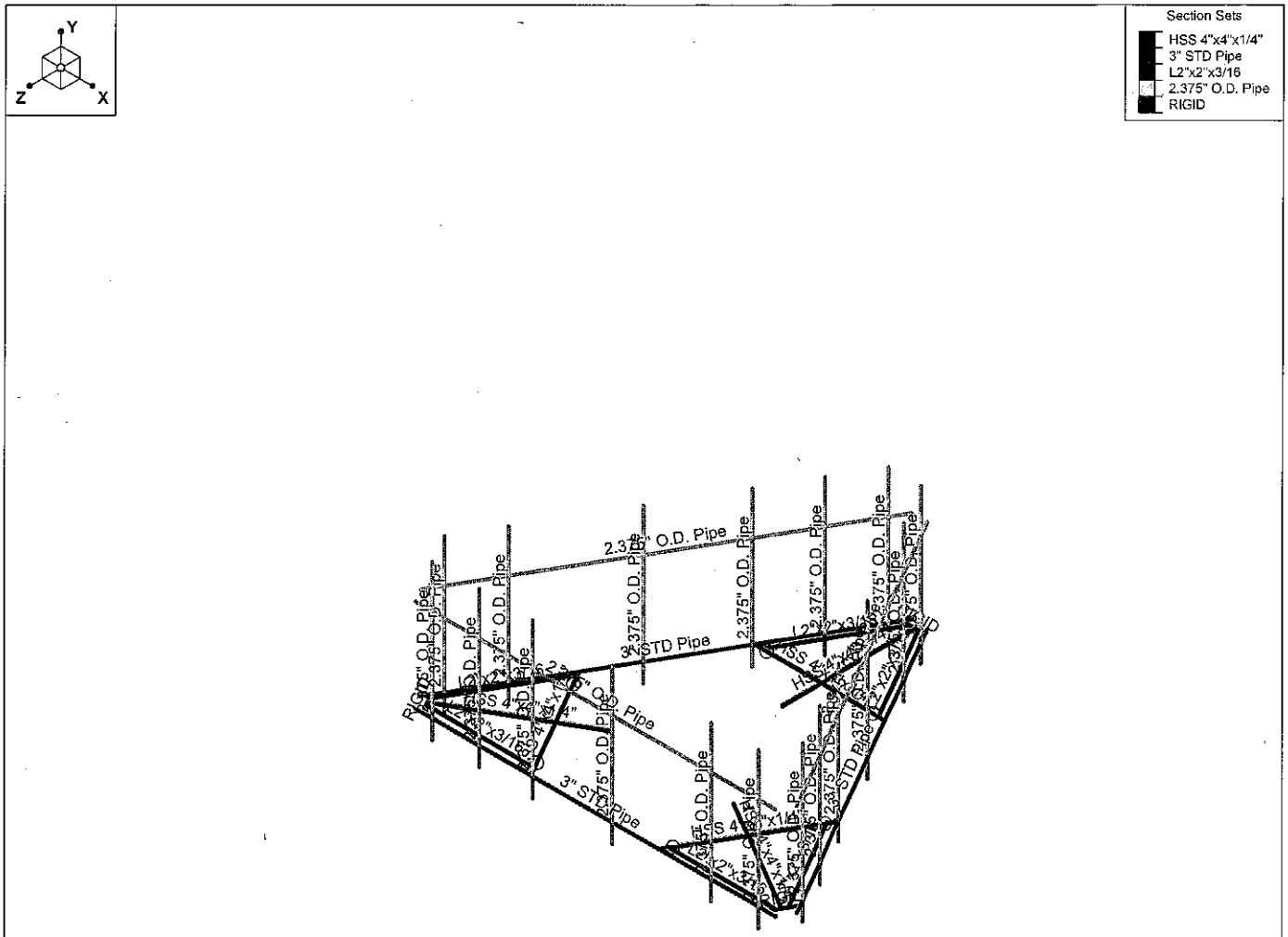

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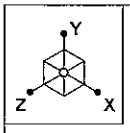

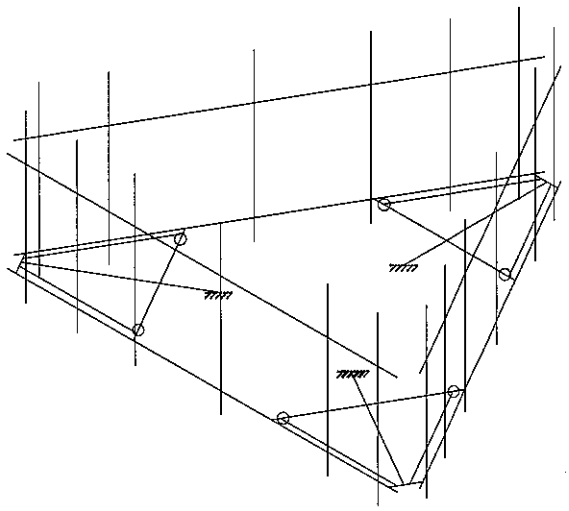

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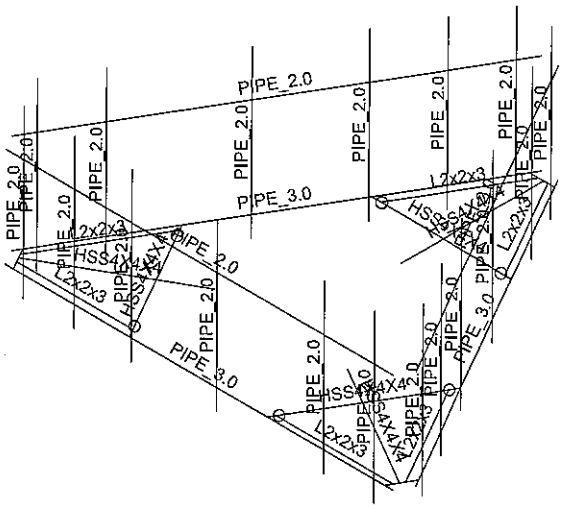

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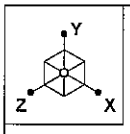

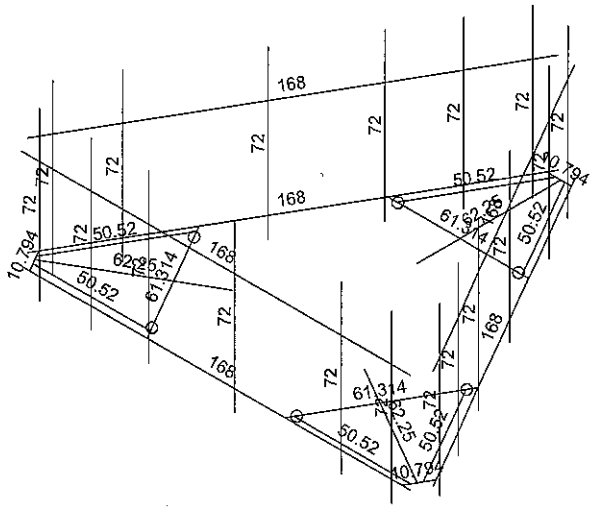

Member Length (in) Displayed
Envelope Only Solution

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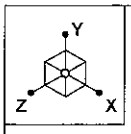

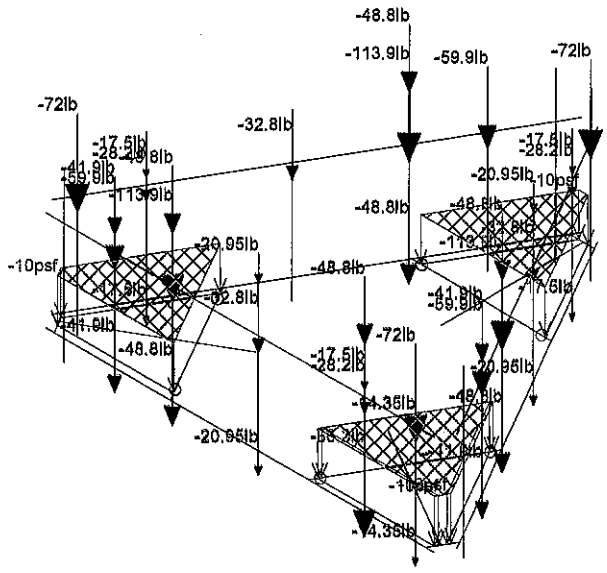

Loads: BLC 1, Self Weight
Envelope Only Solution

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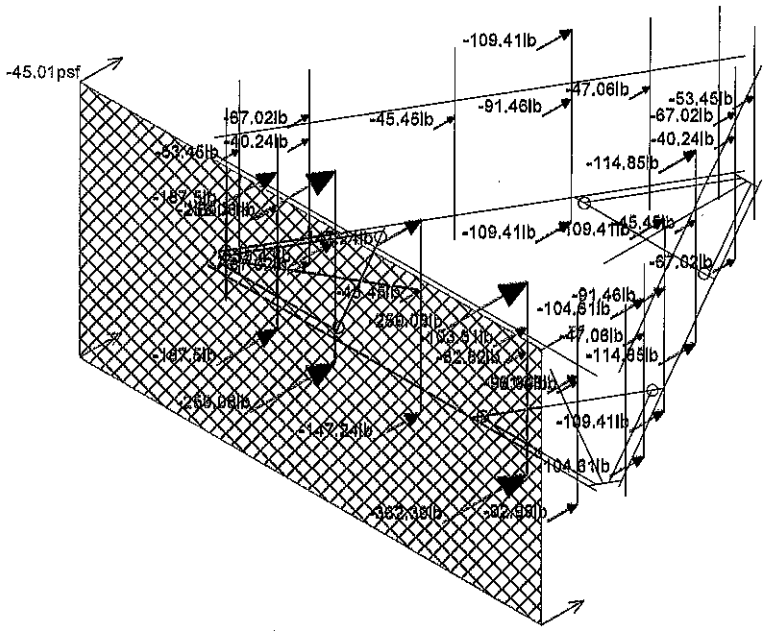

Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution

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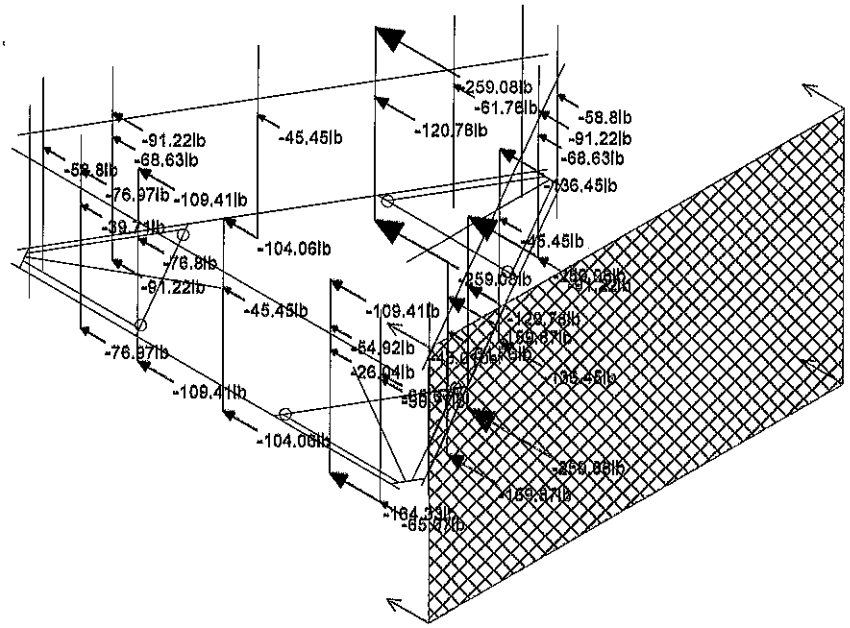

Loads: BLC 3, Wind Load AZI 090
Envelope Only Solution

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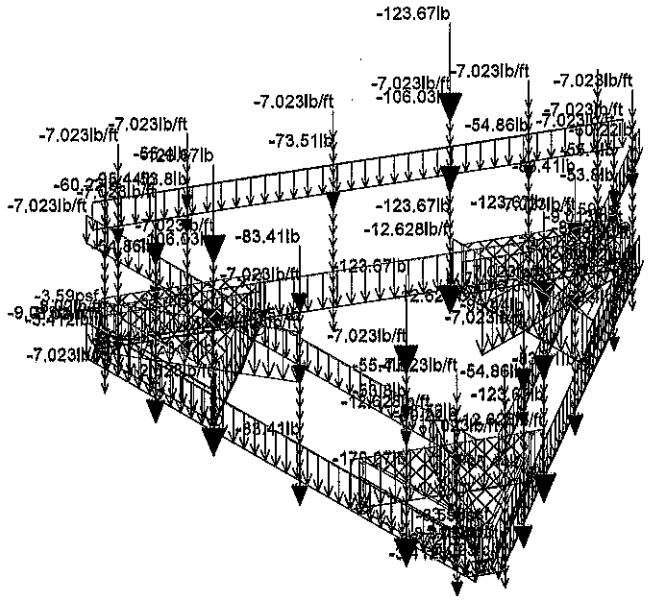

Loads: BLC 4, Ice Weight
Envelope Only Solution

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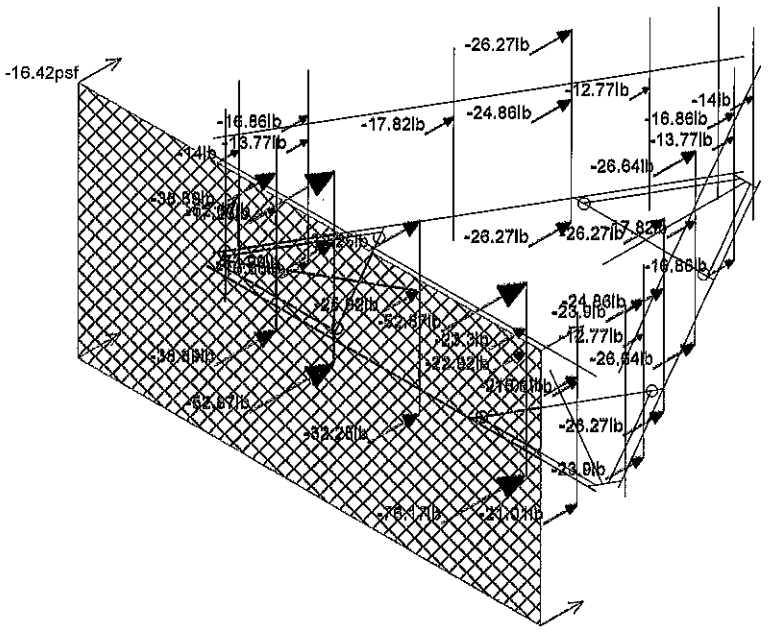

Loads: BLC 5, Wind + Ice Load AZI 000
Envelope Only Solution

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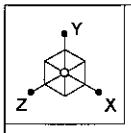

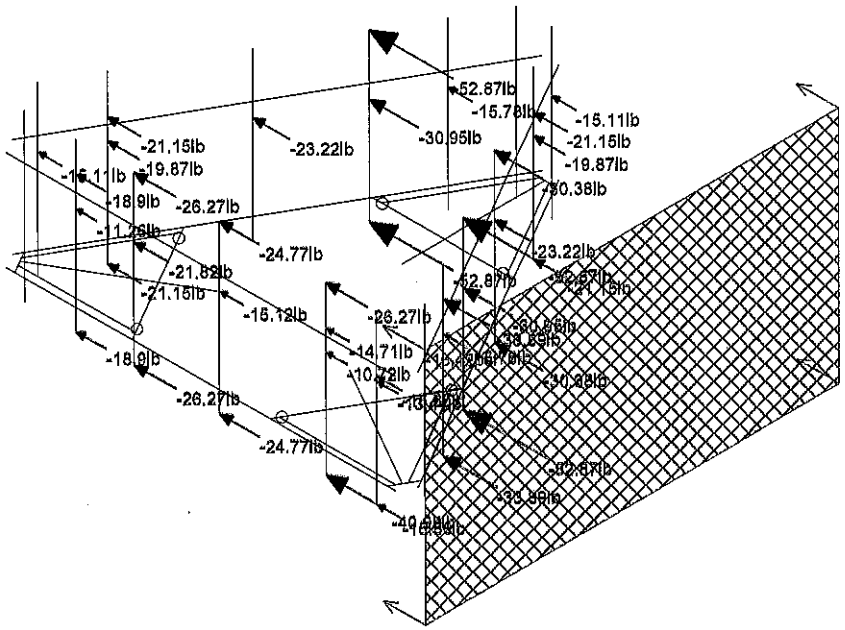

Loads: BLC 6, Wind + Ice Load AZI 090
Envelope Only Solution

Infinigy	823530	Existing Configuration
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APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	823538
Client:	CCI
Carrier:	AT&T
Engineer:	IP
Date:	12/26/2018

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2015 IBC
Structure Load Standard:	TIA-222-H
Antenna Load Standard:	TIA-222-H
Structure Risk Category:	II
Structure Type:	Mount - Platform
Number of Sectors:	3
Structure Shape 1:	Round

Rooftop Inputs:

Rooftop Wind Speed-Up?: No

Wind Loading Inputs:

Design Wind Velocity:	120	mph (ultimate 3-second gust)
Wind Centerline 1 (z_1):	142.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	B	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
37.51	1.00	**45.01**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
6.51	1.00	**16.42**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (ultimate 3-second gust)
Base Ice Thickness:	1.25	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
CCIHPA65R-BU4A	142.0	1	1.00	Flat	Flat	37.51	4.96	185.97	130.15	144.10	172.02
CCIHPA65R-BU8A	142.0	2	1.00	Flat	Flat	37.51	7.85	294.48	208.12	229.71	272.89
Kathrein 80010964	142.0	2	1.00	Flat	Flat	37.51	10.00	375.01	153.95	209.21	319.74
Kathrein 80010965	142.0	4	1.00	Flat	Flat	37.51	13.81	518.17	218.81	293.65	443.33
RVVave 7770	142.0	3	1.00	Flat	Flat	37.51	5.51	206.63	109.84	134.04	182.43
Ericsson RRUS 4415 B30	142.0	3	1.00	Flat	Flat	37.51	1.64	61.63	23.98	33.39	52.22
Ericsson RRUS 4449 B5/B12	142.0	3	1.00	Flat	Flat	37.51	1.97	73.80	52.82	58.07	68.56
Ericsson RRUS 4478 B14	142.0	3	1.00	Flat	Flat	37.51	1.84	69.11	39.71	47.06	61.76
Ericsson RRUS 8843 B2/B66A	142.0	3	1.00	Flat	Flat	37.51	1.64	61.48	50.77	53.45	58.80
RVVave LGP21401	142.0	6	1.00	Flat	Flat	37.51	1.10	41.41	13.02	20.12	34.31
Raycap DC6-48-60-18-8F	142.0	3	1.00	Round	Round	37.51	1.21	45.45	45.45	45.45	45.45

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
2	M2	N74A	N4			RIGID	None	None	RIGID	Typical
3	M8	N19	N18			3" STD Pipe	Beam	None	A53 Gr.B	Typical
4	M11	N28	N76			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
5	M18	N40	N43		270	L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
6	M29	N79	N78			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
7	M14	N56	N55			3" STD Pipe	Beam	None	A53 Gr.B	Typical
8	M18A	N64	N63			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
9	M19	N67	N66			3" STD Pipe	Beam	None	A53 Gr.B	Typical
10	M23	N75	N74			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
11	MP6	N54	N49			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
12	MP5	N50	N55A			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
13	MP4	N51	N56A			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
14	MP2	N53	N58			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
15	MP1	N52	N57			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
16	M20	N41	N42			L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
17	M17A	N59	N60			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
18	M18C	N9	N75A			RIGID	None	None	RIGID	Typical
19	M19B	N77	N31			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
20	M20A	N64A	N67A		270	L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
21	M21	N65	N66A			L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
22	M22	N70A	N71A			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
23	M23A	N79A	N72			RIGID	None	None	RIGID	Typical
24	M24	N74B	N80			HSS 4"x4"x1/4"	Beam	None	A53 Gr.B	Typical
25	M25	N75B	N78A		270	L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
26	M26	N76A	N77A			L2"x2"x3/16	Beam	None	A36 Gr.36	Typical
27	MP3	N77B	N78B			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
28	MP12	N85	N80A			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
29	MP11	N81	N86			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
30	MP10	N82	N87			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
31	MP8	N84	N89			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
32	MP7	N83	N88			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
33	MP9	N90	N91			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
34	MP18	N98	N93			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
35	MP17	N94	N99			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
36	MP16	N95	N100			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
37	MP14	N97	N102			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
38	MP13	N96	N101			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical
39	MP15	N103	N104			2.375" O.D. Pi...	Beam	None	A53 Gr.B	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		3	32.4	0
3	Total General		3	32.4	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L2x2x3	6	303.1	0
7	A53 Gr.B	HSS4X4X4	6	370.7	.4
8	A53 Gr.B	PIPE_2.0	21	1800	.5
9	A53 Gr.B	PIPE_3.0	3	504	.3
10	Total HR Steel		36	2977.8	1.2

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL		-1			42		4	
2	Wind Load AZI 000	WLZ					42		1	
3	Wind Load AZI 090	WLX					42		1	
4	Ice Weight	OL1					42	39	4	
5	Wind + Ice Load AZI 000	OL2					42		1	
6	Wind + Ice Load AZI 090	OL3					42		1	
7	Service Live 1	LL				9				
8	BLC 1 Transient Area Loads	None						45		
9	BLC 2 Transient Area Loads	None						38		
10	BLC 3 Transient Area Loads	None						33		
11	BLC 4 Transient Area Loads	None						45		
12	BLC 5 Transient Area Loads	None						38		
13	BLC 6 Transient Area Loads	None						33		

Load Combinations

	Description	Solve	PDelta	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Fa...
1	1.4D	Yes	Y		DL	1.4						
2	1.2D + 1W AZI 000	Yes	Y		DL	1.2	WLZ	1				
3	1.2D + 1W AZI 030	Yes	Y		DL	1.2	WLZ	.866	WLX	.5		
4	1.2D + 1W AZI 060	Yes	Y		DL	1.2	WLZ	.5	WLX	.866		
5	1.2D + 1W AZI 090	Yes	Y		DL	1.2			WLX	1		
6	1.2D + 1W AZI 120	Yes	Y		DL	1.2	WLZ	-.5	WLX	.866		
7	1.2D + 1W AZI 150	Yes	Y		DL	1.2	WLZ	-.866	WLX	.5		
8	1.2D + 1W AZI 180	Yes	Y		DL	1.2	WLZ	-1				
9	1.2D + 1W AZI 210	Yes	Y		DL	1.2	WLZ	-.866	WLX	-.5		
10	1.2D + 1W AZI 240	Yes	Y		DL	1.2	WLZ	-.5	WLX	-.866		
11	1.2D + 1W AZI 270	Yes	Y		DL	1.2			WLX	-1		
12	1.2D + 1W AZI 300	Yes	Y		DL	1.2	WLZ	.5	WLX	-.866		
13	1.2D + 1W AZI 330	Yes	Y		DL	1.2	WLZ	.866	WLX	-.5		
14	0.9D + 1W AZI 000	Yes	Y		DL	.9	WLZ	1				
15	0.9D + 1W AZI 030	Yes	Y		DL	.9	WLZ	.866	WLX	.5		
16	0.9D + 1W AZI 060	Yes	Y		DL	.9	WLZ	.5	WLX	.866		
17	0.9D + 1W AZI 090	Yes	Y		DL	.9			WLX	1		
18	0.9D + 1W AZI 120	Yes	Y		DL	.9	WLZ	-.5	WLX	.866		
19	0.9D + 1W AZI 150	Yes	Y		DL	.9	WLZ	-.866	WLX	.5		
20	0.9D + 1W AZI 180	Yes	Y		DL	.9	WLZ	-1				
21	0.9D + 1W AZI 210	Yes	Y		DL	.9	WLZ	-.866	WLX	-.5		
22	0.9D + 1W AZI 240	Yes	Y		DL	.9	WLZ	-.5	WLX	-.866		
23	0.9D + 1W AZI 270	Yes	Y		DL	.9			WLX	-1		
24	0.9D + 1W AZI 300	Yes	Y		DL	.9	WLZ	.5	WLX	-.866		
25	0.9D + 1W AZI 330	Yes	Y		DL	.9	WLZ	.866	WLX	-.5		
26	1.2D + 1.0Di	Yes	Y		DL	1.2	OL1	1				
27	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	1		
28	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5
29	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.866
30	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1			OL3	1
31	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.866
32	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5
33	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-1		
34	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5
35	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-.8...
36	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1			OL3	-1
37	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-.8...
38	1.2D + 1.0Di + 1.0Wi AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5

Load Combinations (Continued)

	Description	Solve	PDelta	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Fa...
39	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.063		
40	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.054	WLX	.031
41	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.031	WLX	.054
42	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5			WLX	.063
43	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.031	WLX	.054
44	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.054	WLX	.031
45	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.063		
46	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.054	WLX	-.0...
47	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.031	WLX	-.0...
48	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5			WLX	-.0...
49	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.031	WLX	-.0...
50	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.054	WLX	-.0...

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N70A	max	1446.088	17	2832.986	27	2334.686	14	4774.746	27	1487.173	22	1619.4	23
2		min	-1447.012	23	-313.351	20	-2534.16	8	-1413.46	20	-1492.765	4	-1681.626	5
3	N59	max	2598.387	5	4238.75	35	2144.874	2	1634.804	14	2055.583	19	6684.343	36
4		min	-2423.055	23	43.235	16	-2044.382	20	-4057.065	33	-2063.127	13	-1082.716	17
5	N1	max	1857.793	17	3187.877	31	1846.815	13	1391.727	25	853.403	15	1395.027	23
6		min	-2032.471	11	-208.92	24	-1747.961	19	-3532.392	32	-864.788	9	-4528.297	30
7	N5	max	0	50	0	50	0	50	0	50	0	50	0	50
8		min	0	1	0	1	0	1	0	1	0	1	0	1
9	Totals:	max	5877.406	5	9302.463	29	6186.187	14						
10		min	-5877.406	23	2955.775	22	-6186.187	8						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	MP1	PIPE 2.0	.841	63	8	.123	63		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
2	MP2	PIPE 2.0	.725	63	8	.111	63		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
3	MP3	PIPE 2.0	.670	63	2	.048	63		2	20866.7...	32130	1871.625	1871.625	2...	H1-1b
4	MP4	PIPE 2.0	.666	63	2	.111	63		2	20866.7...	32130	1871.625	1871.625	2...	H1-1b
5	M17A	HSS4X4X4	.647	0	34	.278	0	z	13	101755....	106155	12311.25	12311.25	1	H1-1b
6	MP6	PIPE 2.0	.610	9	8	.147	9		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
7	MP5	PIPE 2.0	.570	63	8	.154	63		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
8	MP10	PIPE 2.0	.544	63	5	.065	63		5	20866.7...	32130	1871.625	1871.625	1...	H1-1b
9	MP12	PIPE 2.0	.475	9	6	.103	9		12	20866.7...	32130	1871.625	1871.625	1...	H1-1b
10	MP9	PIPE 2.0	.474	63	5	.075	63		11	20866.7...	32130	1871.625	1871.625	1...	H1-1b
11	M1	HSS4X4X4	.464	0	32	.242	0	z	9	101755....	106155	12311.25	12311.25	1	H1-1b
12	M8	PIPE 3.0	.453	162.75	2	.550	162.75		8	59302.8...	65205	5748.75	5748.75	1	H3-6
13	MP11	PIPE 2.0	.449	63	12	.107	63		12	20866.7...	32130	1871.625	1871.625	1...	H1-1b
14	M22	HSS4X4X4	.441	0	3	.211	0	z	5	101755....	106155	12311.25	12311.25	1	H1-1b
15	MP8	PIPE 2.0	.429	63	11	.110	63		11	20866.7...	32130	1871.625	1871.625	2...	H1-1b
16	MP7	PIPE 2.0	.420	63	12	.092	63		12	20866.7...	32130	1871.625	1871.625	2...	H1-1b
17	MP16	PIPE 2.0	.388	63	10	.051	63		4	20866.7...	32130	1871.625	1871.625	1...	H1-1b
18	MP15	PIPE 2.0	.375	63	6	.061	63		6	20866.7...	32130	1871.625	1871.625	2...	H1-1b
19	M14	PIPE 3.0	.346	5.25	7	.364	5.25		12	59302.8...	65205	5748.75	5748.75	1	H3-6
20	MP13	PIPE 2.0	.340	63	10	.060	63		5	20866.7...	32130	1871.625	1871.625	2...	H1-1b
21	MP17	PIPE 2.0	.340	63	5	.092	63		4	20866.7...	32130	1871.625	1871.625	2...	H1-1b
22	M19B	HSS4X4X4	.337	30.657	36	.193	61.314	z	13	103885....	106155	12311.25	12311.25	1	H1-1b
23	MP18	PIPE 2.0	.336	9	4	.081	9		4	20866.7...	32130	1871.625	1871.625	1...	H1-1b
24	MP14	PIPE 2.0	.306	63	4	.061	63		5	20866.7...	32130	1871.625	1871.625	1...	H1-1b
25	M11	HSS4X4X4	.287	30.657	32	.203	3.832	z	2	103885....	106155	12311.25	12311.25	1	H1-1b
26	M18A	PIPE 2.0	.256	56	10	.119	54.25		5	25978.8...	32130	1871.625	1871.625	1	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
27	M29	PIPE 2.0	.254	91	11	.170	31.5		2	25978.8...	32130	1871.625	1871.625	1	H1-1b
28	M24	HSS4X4X4	.238	31.296	38	.141	58.759	z	5	103885....	106155	12311.25	12311.25	1	H1-1b
29	M19	PIPE 3.0	.237	5.25	11	.277	7		4	59302.8...	65205	5748.75	5748.75	1	H3-6
30	M23	PIPE 2.0	.223	56	7	.114	31.5		5	25978.8...	32130	1871.625	1871.625	1	H1-1b
31	M18	L2x2x3	.207	50.52	2	.013	50.52	z	27	9626.318	23392.8	557.717	1239.29	2...	H2-1
32	M21	L2x2x3	.202	50.52	13	.018	50.52	y	38	9626.318	23392.8	557.717	1224.087	2...	H2-1
33	M20A	L2x2x3	.193	50.52	31	.019	50.52	z	31	9626.318	23392.8	557.717	1239.29	2...	H2-1
34	M26	L2x2x3	.138	50.52	5	.012	50.52	y	30	9626.318	23392.8	557.717	1212.683	1...	H2-1
35	M25	L2x2x3	.135	50.52	11	.012	50.52	z	36	9626.318	23392.8	557.717	1209.889	1...	H2-1
36	M20	L2x2x3	.124	50.52	34	.012	50.52	y	34	9626.318	23392.8	557.717	1239.29	2...	H2-1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	HSS 4"x4"x1/4"	HSS4X4X4	Beam	None	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
2	3" STD Pipe	PIPE 3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
3	L2"x2"x3/16	L2x2x3	Beam	None	A36 Gr.36	Typical	.722	.271	.271	.009
4	2.375" O.D. PI...	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	L2.5X2.5X3	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical	.901	.535	.535	.011

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N59	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N70A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes	** NA **			None
3	M8						Yes				None
4	M11	BenPIN	BenPIN				Yes				None
5	M18						Yes				None
6	M29						Yes				None
7	M14						Yes				None
8	M18A						Yes				None
9	M19						Yes				None
10	M23						Yes				None
11	MP6						Yes				None
12	MP5						Yes				None
13	MP4						Yes				None
14	MP2						Yes				None
15	MP1						Yes				None
16	M20						Yes				None
17	M17A						Yes				None
18	M18C						Yes	** NA **			None
19	M19B	BenPIN	BenPIN				Yes				None
20	M20A						Yes				None
21	M21						Yes				None
22	M22						Yes				None
23	M23A						Yes	** NA **			None
24	M24	BenPIN	BenPIN				Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
25	M25						Yes				None
26	M26						Yes				None
27	MP3						Yes				None
28	MP12						Yes				None
29	MP11						Yes				None
30	MP10						Yes				None
31	MP8						Yes				None
32	MP7						Yes				None
33	MP9						Yes				None
34	MP18						Yes				None
35	MP17						Yes				None
36	MP16						Yes				None
37	MP14						Yes				None
38	MP13						Yes				None
39	MP15						Yes				None

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[psi]	Ry	Fu[psi]	Rt
1	A992	29000	11154	.3	.65	.49	50000	1.1	65000	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36000	1.5	58000	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50000	1.1	65000	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42000	1.4	58000	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46000	1.4	58000	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35000	1.6	60000	1.2
7	A1085	29000	11154	.3	.65	.49	50000	1.4	65000	1.3

Joint Loads and Enforced Displacements (BLC 7 : Service Live 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	Y	-250
2	N18	L	Y	-250
3	N55	L	Y	-250
4	N56	L	Y	-250
5	N66	L	Y	-250
6	N67	L	Y	-250
7	N126A	L	Y	-250
8	N128A	L	Y	-250
9	N130	L	Y	-250

Member Point Loads (BLC 1 : Self Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-14.35	24
2	MP3	Y	-20.95	0
3	MP5	Y	-41.9	13
4	MP4	Y	-48.8	0
5	MP2	Y	-17.5	17
6	MP4	Y	-42.9	26
7	MP4	Y	-71	26
8	MP5	Y	-59.9	26
9	MP1	Y	-72	26
10	MP2	Y	-28.2	26
11	MP3	Y	-32.8	26
12	MP1	Y	-14.35	72

Member Point Loads (BLC 1 : Self Weight) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
13	MP3	Y	-20.95	72
14	MP5	Y	-41.9	72
15	MP4	Y	-48.8	72
16	MP2	Y	-17.5	72
17	MP9	Y	-20.95	0
18	MP11	Y	-41.9	13
19	MP10	Y	-48.8	0
20	MP8	Y	-17.5	17
21	MP10	Y	-42.9	26
22	MP10	Y	-71	26
23	MP11	Y	-59.9	26
24	MP7	Y	-72	26
25	MP8	Y	-28.2	26
26	MP9	Y	-32.8	26
27	MP9	Y	-20.95	72
28	MP11	Y	-41.9	72
29	MP10	Y	-48.8	72
30	MP8	Y	-17.5	72
31	MP16	Y	-48.8	0
32	MP14	Y	-17.5	17
33	MP16	Y	-42.9	26
34	MP16	Y	-71	26
35	MP17	Y	-59.9	26
36	MP13	Y	-72	26
37	MP14	Y	-28.2	26
38	MP15	Y	-32.8	26
39	MP16	Y	-48.8	72
40	MP14	Y	-17.5	72
41	MP2	Y	-48.8	0
42	MP2	Y	-48.8	72

Member Point Loads (BLC 2 : Wind Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-92.99	24
2	MP3	Z	-147.24	0
3	MP5	Z	-187.5	13
4	MP4	Z	-259.08	0
5	MP2	Z	-103.31	17
6	MP4	Z	-61.63	26
7	MP4	Z	-73.8	26
8	MP5	Z	-69.11	26
9	MP1	Z	-61.48	26
10	MP2	Z	-82.82	26
11	MP3	Z	-45.45	26
12	MP1	Z	-92.99	72
13	MP3	Z	-147.24	72
14	MP5	Z	-187.5	72
15	MP4	Z	-259.08	72
16	MP2	Z	-103.31	72
17	MP9	Z	-114.85	0
18	MP11	Z	-104.61	13
19	MP10	Z	-109.41	0
20	MP8	Z	-67.02	17
21	MP10	Z	-33.39	26
22	MP10	Z	-58.07	26
23	MP11	Z	-47.06	26

Member Point Loads (BLC 2 : Wind Load AZI 000) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
24	MP7	Z	-53.45	26
25	MP8	Z	-40.24	26
26	MP9	Z	-45.45	26
27	MP9	Z	-114.85	72
28	MP11	Z	-104.61	72
29	MP10	Z	-109.41	72
30	MP8	Z	-67.02	72
31	MP16	Z	-109.41	0
32	MP14	Z	-67.02	17
33	MP16	Z	-33.39	26
34	MP16	Z	-58.07	26
35	MP17	Z	-47.06	26
36	MP13	Z	-53.45	26
37	MP14	Z	-40.24	26
38	MP15	Z	-45.45	26
39	MP16	Z	-109.41	72
40	MP14	Z	-67.02	72
41	MP2	Z	-259.08	0
42	MP2	Z	-259.08	72

Member Point Loads (BLC 3 : Wind Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-65.07	24
2	MP3	X	-104.06	0
3	MP5	X	-76.97	13
4	MP4	X	-109.41	0
5	MP2	X	-54.92	17
6	MP4	X	-23.98	26
7	MP4	X	-52.82	26
8	MP5	X	-39.71	26
9	MP1	X	-50.77	26
10	MP2	X	-26.04	26
11	MP3	X	-45.45	26
12	MP1	X	-65.07	72
13	MP3	X	-104.06	72
14	MP5	X	-76.97	72
15	MP4	X	-109.41	72
16	MP2	X	-54.92	72
17	MP9	X	-136.45	0
18	MP11	X	-159.87	13
19	MP10	X	-259.08	0
20	MP8	X	-91.22	17
21	MP10	X	-52.22	26
22	MP10	X	-68.56	26
23	MP11	X	-61.76	26
24	MP7	X	-58.8	26
25	MP8	X	-68.63	26
26	MP9	X	-45.45	26
27	MP9	X	-136.45	72
28	MP11	X	-159.87	72
29	MP10	X	-259.08	72
30	MP8	X	-91.22	72
31	MP16	X	-259.08	0
32	MP14	X	-91.22	17
33	MP16	X	-52.22	26
34	MP16	X	-68.56	26

Member Point Loads (BLC 3 : Wind Load AZI 090) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
35	MP17	X	-61.76	26
36	MP13	X	-58.8	26
37	MP14	X	-68.63	26
38	MP15	X	-45.45	26
39	MP16	X	-259.08	72
40	MP14	X	-91.22	72
41	MP2	X	-109.41	0
42	MP2	X	-109.41	72

Member Point Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-58.72	24
2	MP3	Y	-83.41	0
3	MP5	Y	-95.44	13
4	MP4	Y	-123.67	0
5	MP2	Y	-55.4	17
6	MP4	Y	-42.82	26
7	MP4	Y	-63.21	26
8	MP5	Y	-54.86	26
9	MP1	Y	-60.22	26
10	MP2	Y	-53.8	26
11	MP3	Y	-73.51	26
12	MP1	Y	-58.72	72
13	MP3	Y	-83.41	72
14	MP5	Y	-95.44	72
15	MP4	Y	-123.67	72
16	MP2	Y	-55.4	72
17	MP9	Y	-83.41	0
18	MP11	Y	-95.44	13
19	MP10	Y	-123.67	0
20	MP8	Y	-55.4	17
21	MP10	Y	-42.82	26
22	MP10	Y	-63.21	26
23	MP11	Y	-54.86	26
24	MP7	Y	-60.22	26
25	MP8	Y	-53.8	26
26	MP9	Y	-73.51	26
27	MP9	Y	-83.41	72
28	MP11	Y	-95.44	72
29	MP10	Y	-123.67	72
30	MP8	Y	-55.4	72
31	MP16	Y	-123.67	0
32	MP14	Y	-55.4	17
33	MP16	Y	-42.82	26
34	MP16	Y	-63.21	26
35	MP17	Y	-54.86	26
36	MP13	Y	-60.22	26
37	MP14	Y	-53.8	26
38	MP15	Y	-73.51	26
39	MP16	Y	-123.67	72
40	MP14	Y	-55.4	72
41	MP2	Y	-123.67	0
42	MP2	Y	-123.67	72

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000)

Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-21.01	24
2	MP3	Z	-32.25	0
3	MP5	Z	-38.89	13
4	MP4	Z	-52.87	0
5	MP2	Z	-23.3	17
6	MP4	Z	-15.7	26
7	MP4	Z	-18.29	26
8	MP5	Z	-17.28	26
9	MP1	Z	-15.67	26
10	MP2	Z	-22.92	26
11	MP3	Z	-25.92	26
12	MP1	Z	-21.01	72
13	MP3	Z	-32.25	72
14	MP5	Z	-38.89	72
15	MP4	Z	-52.87	72
16	MP2	Z	-23.3	72
17	MP9	Z	-26.64	0
18	MP11	Z	-23.9	13
19	MP10	Z	-26.27	0
20	MP8	Z	-16.86	17
21	MP10	Z	-9.76	26
22	MP10	Z	-15.1	26
23	MP11	Z	-12.77	26
24	MP7	Z	-14	26
25	MP8	Z	-13.77	26
26	MP9	Z	-17.82	26
27	MP9	Z	-26.64	72
28	MP11	Z	-23.9	72
29	MP10	Z	-26.27	72
30	MP8	Z	-16.86	72
31	MP16	Z	-26.27	0
32	MP14	Z	-16.86	17
33	MP16	Z	-9.76	26
34	MP16	Z	-15.1	26
35	MP17	Z	-12.77	26
36	MP13	Z	-14	26
37	MP14	Z	-13.77	26
38	MP15	Z	-17.82	26
39	MP16	Z	-26.27	72
40	MP14	Z	-16.86	72
41	MP2	Z	-52.87	0
42	MP2	Z	-52.87	72

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-15.86	24
2	MP3	X	-24.77	0
3	MP5	X	-18.9	13
4	MP4	X	-26.27	0
5	MP2	X	-14.71	17
6	MP4	X	-7.78	26
7	MP4	X	-14.04	26
8	MP5	X	-11.26	26
9	MP1	X	-13.44	26
10	MP2	X	-10.72	26
11	MP3	X	-15.12	26

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
12	MP1	X	-15.86	72
13	MP3	X	-24.77	72
14	MP5	X	-18.9	72
15	MP4	X	-26.27	72
16	MP2	X	-14.71	72
17	MP9	X	-30.38	0
18	MP11	X	-33.89	13
19	MP10	X	-52.87	0
20	MP8	X	-21.15	17
21	MP10	X	-13.72	26
22	MP10	X	-17.23	26
23	MP11	X	-15.78	26
24	MP7	X	-15.11	26
25	MP8	X	-19.87	26
26	MP9	X	-23.22	26
27	MP9	X	-30.38	72
28	MP11	X	-33.89	72
29	MP10	X	-52.87	72
30	MP8	X	-21.15	72
31	MP16	X	-52.87	0
32	MP14	X	-21.15	17
33	MP16	X	-13.72	26
34	MP16	X	-17.23	26
35	MP17	X	-15.78	26
36	MP13	X	-15.11	26
37	MP14	X	-19.87	26
38	MP15	X	-23.22	26
39	MP16	X	-52.87	72
40	MP14	X	-21.15	72
41	MP2	X	-26.27	0
42	MP2	X	-26.27	72

Member Distributed Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Y	-12.628	-12.628	0	%100
2	M2	Y	-3.412	-3.412	0	%100
3	M8	Y	-9.013	-9.013	0	%100
4	M11	Y	-12.628	-12.628	0	%100
5	M18	Y	-8.02	-8.02	0	%100
6	M29	Y	-7.023	-7.023	0	%100
7	M14	Y	-9.013	-9.013	0	%100
8	M18A	Y	-7.023	-7.023	0	%100
9	M19	Y	-9.013	-9.013	0	%100
10	M23	Y	-7.023	-7.023	0	%100
11	MP6	Y	-7.023	-7.023	0	%100
12	MP5	Y	-7.023	-7.023	0	%100
13	MP4	Y	-7.023	-7.023	0	%100
14	MP2	Y	-7.023	-7.023	0	%100
15	MP1	Y	-7.023	-7.023	0	%100
16	M20	Y	-8.02	-8.02	0	%100
17	M17A	Y	-12.628	-12.628	0	%100
18	M18C	Y	-3.412	-3.412	0	%100
19	M19B	Y	-12.628	-12.628	0	%100
20	M20A	Y	-8.02	-8.02	0	%100
21	M21	Y	-8.02	-8.02	0	%100

Member Distributed Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
22	M22	Y	-12.628	-12.628	0	%100
23	M23A	Y	-3.412	-3.412	0	%100
24	M24	Y	-12.628	-12.628	0	%100
25	M25	Y	-8.02	-8.02	0	%100
26	M26	Y	-8.02	-8.02	0	%100
27	MP3	Y	-7.023	-7.023	0	%100
28	MP12	Y	-7.023	-7.023	0	%100
29	MP11	Y	-7.023	-7.023	0	%100
30	MP10	Y	-7.023	-7.023	0	%100
31	MP8	Y	-7.023	-7.023	0	%100
32	MP7	Y	-7.023	-7.023	0	%100
33	MP9	Y	-7.023	-7.023	0	%100
34	MP18	Y	-7.023	-7.023	0	%100
35	MP17	Y	-7.023	-7.023	0	%100
36	MP16	Y	-7.023	-7.023	0	%100
37	MP14	Y	-7.023	-7.023	0	%100
38	MP13	Y	-7.023	-7.023	0	%100
39	MP15	Y	-7.023	-7.023	0	%100

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Y	-.084	-13.959	12.45	22.41
2	M1	Y	-13.959	-21.152	22.41	32.37
3	M1	Y	-21.152	-10.19	32.37	42.33
4	M1	Y	-10.19	-5.069	42.33	52.29
5	M1	Y	-5.069	-3.387	52.29	62.25
6	M18	Y	-.786	-3.239	0	10.104
7	M18	Y	-3.239	-4.227	10.104	20.208
8	M18	Y	-4.227	-6.191	20.208	30.312
9	M18	Y	-6.191	-8.579	30.312	40.416
10	M18	Y	-8.579	-8.951	40.416	50.52
11	M20	Y	-.785	-3.242	0	10.104
12	M20	Y	-3.242	-4.231	10.104	20.208
13	M20	Y	-4.231	-6.195	20.208	30.312
14	M20	Y	-6.195	-8.581	30.312	40.416
15	M20	Y	-8.581	-8.945	40.416	50.52
16	M17A	Y	-5.031	-27.036	12.45	22.41
17	M17A	Y	-27.036	-37.043	22.41	32.37
18	M17A	Y	-37.043	-22.05	32.37	42.33
19	M17A	Y	-22.05	-11.965	42.33	52.29
20	M17A	Y	-11.965	-5.915	52.29	62.25
21	M20A	Y	-2.197	-6.696	0	10.104
22	M20A	Y	-6.696	-9.307	10.104	20.208
23	M20A	Y	-9.307	-12.98	20.208	30.312
24	M20A	Y	-12.98	-17.472	30.312	40.416
25	M20A	Y	-17.472	-19.835	40.416	50.52
26	M21	Y	-.749	-5.116	0	10.104
27	M21	Y	-5.116	-7.821	10.104	20.208
28	M21	Y	-7.821	-11.784	20.208	30.312
29	M21	Y	-11.784	-16.714	30.312	40.416
30	M21	Y	-16.714	-19.587	40.416	50.52
31	M22	Y	-.084	-13.959	12.45	22.41
32	M22	Y	-13.959	-21.152	22.41	32.37
33	M22	Y	-21.152	-10.19	32.37	42.33
34	M22	Y	-10.19	-5.069	42.33	52.29
35	M22	Y	-5.069	-3.387	52.29	62.25

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
36	M25	Y	-.786	-3.239	0	10.104
37	M25	Y	-3.239	-4.227	10.104	20.208
38	M25	Y	-4.227	-6.191	20.208	30.312
39	M25	Y	-6.191	-8.579	30.312	40.416
40	M25	Y	-8.579	-8.951	40.416	50.52
41	M26	Y	-.785	-3.242	0	10.104
42	M26	Y	-3.242	-4.231	10.104	20.208
43	M26	Y	-4.231	-6.195	20.208	30.312
44	M26	Y	-6.195	-8.581	30.312	40.416
45	M26	Y	-8.581	-8.945	40.416	50.52

Member Distributed Loads (BLC 9 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Z	-12.993	-12.993	0	62.25
2	M2	Z	0	0	0	10.794
3	M8	Z	-13.128	-13.128	0	168
4	M11	Z	-7.502	-7.502	0	61.314
5	M18	Z	-7.502	-7.502	0	50.52
6	M29	Z	-8.908	-8.908	0	168
7	M14	Z	-6.564	-6.564	0	168
8	M18A	Z	-4.454	-4.454	0	168
9	M19	Z	-6.564	-6.564	0	168
10	M23	Z	-4.454	-4.454	0	168
11	MP6	Z	-8.908	-8.908	0	72
12	MP5	Z	-8.908	-8.908	0	72
13	MP4	Z	-8.908	-8.908	0	72
14	MP2	Z	-8.908	-8.908	0	72
15	MP1	Z	-8.908	-8.908	0	72
16	M20	Z	-3.751	-3.751	0	50.52
17	M17A	Z	-12.993	-12.993	0	62.25
18	M18C	Z	0	0	0	10.794
19	M19B	Z	-7.502	-7.502	0	61.314
20	M20A	Z	-3.751	-3.751	0	50.52
21	M21	Z	-7.502	-7.502	0	50.52
22	M23A	Z	0	0	0	10.794
23	M24	Z	-15.003	-15.003	0	61.314
24	M25	Z	-3.751	-3.751	0	50.52
25	M26	Z	-3.751	-3.751	0	50.52
26	MP3	Z	-8.908	-8.908	0	72
27	MP12	Z	-8.908	-8.908	0	72
28	MP11	Z	-8.908	-8.908	0	72
29	MP10	Z	-8.908	-8.908	0	72
30	MP8	Z	-8.908	-8.908	0	72
31	MP7	Z	-8.908	-8.908	0	72
32	MP9	Z	-8.908	-8.908	0	72
33	MP18	Z	-8.908	-8.908	0	72
34	MP17	Z	-8.908	-8.908	0	72
35	MP16	Z	-8.908	-8.908	0	72
36	MP14	Z	-8.908	-8.908	0	72
37	MP13	Z	-8.908	-8.908	0	72
38	MP15	Z	-8.908	-8.908	0	72

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	X	-7.502	-7.502	0	62.25
2	M2	X	0	0	0	10.794

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
3	M11	X	-12.993	-12.993	0	61.314
4	M14	X	-11.369	-11.369	0	168
5	M18A	X	-7.715	-7.715	0	168
6	M19	X	-11.369	-11.369	0	168
7	M23	X	-7.715	-7.715	0	168
8	MP6	X	-8.908	-8.908	0	72
9	MP5	X	-8.908	-8.908	0	72
10	MP4	X	-8.908	-8.908	0	72
11	MP2	X	-8.908	-8.908	0	72
12	MP1	X	-8.908	-8.908	0	72
13	M20	X	-6.497	-6.497	0	50.52
14	M17A	X	-7.502	-7.502	0	62.25
15	M18C	X	0	0	0	10.794
16	M19B	X	-12.993	-12.993	0	61.314
17	M20A	X	-6.497	-6.497	0	50.52
18	M22	X	-15.003	-15.003	0	62.25
19	M25	X	-6.497	-6.497	0	50.52
20	M26	X	-6.497	-6.497	0	50.52
21	MP3	X	-8.908	-8.908	0	72
22	MP12	X	-8.908	-8.908	0	72
23	MP11	X	-8.908	-8.908	0	72
24	MP10	X	-8.908	-8.908	0	72
25	MP8	X	-8.908	-8.908	0	72
26	MP7	X	-8.908	-8.908	0	72
27	MP9	X	-8.908	-8.908	0	72
28	MP18	X	-8.908	-8.908	0	72
29	MP17	X	-8.908	-8.908	0	72
30	MP16	X	-8.908	-8.908	0	72
31	MP14	X	-8.908	-8.908	0	72
32	MP13	X	-8.908	-8.908	0	72
33	MP15	X	-8.908	-8.908	0	72

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Y	-.03	-5.011	12.45	22.41
2	M1	Y	-5.011	-7.594	22.41	32.37
3	M1	Y	-7.594	-3.658	32.37	42.33
4	M1	Y	-3.658	-1.82	42.33	52.29
5	M1	Y	-1.82	-1.216	52.29	62.25
6	M18	Y	-.282	-1.163	0	10.104
7	M18	Y	-1.163	-1.518	10.104	20.208
8	M18	Y	-1.518	-2.223	20.208	30.312
9	M18	Y	-2.223	-3.08	30.312	40.416
10	M18	Y	-3.08	-3.214	40.416	50.52
11	M20	Y	-.282	-1.164	0	10.104
12	M20	Y	-1.164	-1.519	10.104	20.208
13	M20	Y	-1.519	-2.224	20.208	30.312
14	M20	Y	-2.224	-3.081	30.312	40.416
15	M20	Y	-3.081	-3.211	40.416	50.52
16	M17A	Y	-1.806	-9.706	12.45	22.41
17	M17A	Y	-9.706	-13.298	22.41	32.37
18	M17A	Y	-13.298	-7.916	32.37	42.33
19	M17A	Y	-7.916	-4.296	42.33	52.29
20	M17A	Y	-4.296	-2.124	52.29	62.25
21	M20A	Y	-.789	-2.404	0	10.104
22	M20A	Y	-2.404	-3.341	10.104	20.208

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
23	M20A	Y	-3.341	-4.66	20.208	30.312
24	M20A	Y	-4.66	-6.272	30.312	40.416
25	M20A	Y	-6.272	-7.121	40.416	50.52
26	M21	Y	-.269	-1.836	0	10.104
27	M21	Y	-1.836	-2.808	10.104	20.208
28	M21	Y	-2.808	-4.23	20.208	30.312
29	M21	Y	-4.23	-6	30.312	40.416
30	M21	Y	-6	-7.032	40.416	50.52
31	M22	Y	-.03	-5.011	12.45	22.41
32	M22	Y	-5.011	-7.594	22.41	32.37
33	M22	Y	-7.594	-3.658	32.37	42.33
34	M22	Y	-3.658	-1.82	42.33	52.29
35	M22	Y	-1.82	-1.216	52.29	62.25
36	M25	Y	-.282	-1.163	0	10.104
37	M25	Y	-1.163	-1.518	10.104	20.208
38	M25	Y	-1.518	-2.223	20.208	30.312
39	M25	Y	-2.223	-3.08	30.312	40.416
40	M25	Y	-3.08	-3.214	40.416	50.52
41	M26	Y	-.282	-1.164	0	10.104
42	M26	Y	-1.164	-1.519	10.104	20.208
43	M26	Y	-1.519	-2.224	20.208	30.312
44	M26	Y	-2.224	-3.081	30.312	40.416
45	M26	Y	-3.081	-3.211	40.416	50.52

Member Distributed Loads (BLC 12 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Z	-4.74	-4.74	0	62.25
2	M2	Z	0	0	0	10.794
3	M8	Z	-4.789	-4.789	0	168
4	M11	Z	-2.737	-2.737	0	61.314
5	M18	Z	-2.737	-2.737	0	50.52
6	M29	Z	-3.25	-3.25	0	168
7	M14	Z	-2.395	-2.395	0	168
8	M18A	Z	-1.625	-1.625	0	168
9	M19	Z	-2.395	-2.395	0	168
10	M23	Z	-1.625	-1.625	0	168
11	MP6	Z	-3.25	-3.25	0	72
12	MP5	Z	-3.25	-3.25	0	72
13	MP4	Z	-3.25	-3.25	0	72
14	MP2	Z	-3.25	-3.25	0	72
15	MP1	Z	-3.25	-3.25	0	72
16	M20	Z	-1.368	-1.368	0	50.52
17	M17A	Z	-4.74	-4.74	0	62.25
18	M18C	Z	0	0	0	10.794
19	M19B	Z	-2.737	-2.737	0	61.314
20	M20A	Z	-1.368	-1.368	0	50.52
21	M21	Z	-2.737	-2.737	0	50.52
22	M23A	Z	0	0	0	10.794
23	M24	Z	-5.473	-5.473	0	61.314
24	M25	Z	-1.368	-1.368	0	50.52
25	M26	Z	-1.368	-1.368	0	50.52
26	MP3	Z	-3.25	-3.25	0	72
27	MP12	Z	-3.25	-3.25	0	72
28	MP11	Z	-3.25	-3.25	0	72
29	MP10	Z	-3.25	-3.25	0	72
30	MP8	Z	-3.25	-3.25	0	72

Member Distributed Loads (BLC 12 : BLC 5 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
31	MP7	Z	-3.25	-3.25	0	72
32	MP9	Z	-3.25	-3.25	0	72
33	MP18	Z	-3.25	-3.25	0	72
34	MP17	Z	-3.25	-3.25	0	72
35	MP16	Z	-3.25	-3.25	0	72
36	MP14	Z	-3.25	-3.25	0	72
37	MP13	Z	-3.25	-3.25	0	72
38	MP15	Z	-3.25	-3.25	0	72

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	X	-2.737	-2.737	0	62.25
2	M2	X	0	0	0	10.794
3	M11	X	-4.74	-4.74	0	61.314
4	M14	X	-4.148	-4.148	0	168
5	M18A	X	-2.814	-2.814	0	168
6	M19	X	-4.148	-4.148	0	168
7	M23	X	-2.814	-2.814	0	168
8	MP6	X	-3.25	-3.25	0	72
9	MP5	X	-3.25	-3.25	0	72
10	MP4	X	-3.25	-3.25	0	72
11	MP2	X	-3.25	-3.25	0	72
12	MP1	X	-3.25	-3.25	0	72
13	M20	X	-2.37	-2.37	0	50.52
14	M17A	X	-2.737	-2.737	0	62.25
15	M18C	X	0	0	0	10.794
16	M19B	X	-4.74	-4.74	0	61.314
17	M20A	X	-2.37	-2.37	0	50.52
18	M22	X	-5.473	-5.473	0	62.25
19	M25	X	-2.37	-2.37	0	50.52
20	M26	X	-2.37	-2.37	0	50.52
21	MP3	X	-3.25	-3.25	0	72
22	MP12	X	-3.25	-3.25	0	72
23	MP11	X	-3.25	-3.25	0	72
24	MP10	X	-3.25	-3.25	0	72
25	MP8	X	-3.25	-3.25	0	72
26	MP7	X	-3.25	-3.25	0	72
27	MP9	X	-3.25	-3.25	0	72
28	MP18	X	-3.25	-3.25	0	72
29	MP17	X	-3.25	-3.25	0	72
30	MP16	X	-3.25	-3.25	0	72
31	MP14	X	-3.25	-3.25	0	72
32	MP13	X	-3.25	-3.25	0	72
33	MP15	X	-3.25	-3.25	0	72

APPENDIX D

ADDITIONAL CALCUATIONS

Date:	12/26/2018
Client	Crown Castle
Carrier	AT&T
Engineer:	IP
Site:	823530
Job #:	600-003

Code:	LRFD	
Axial:	4238.70	lbs
Shear:	2334.68	lbs

Bolt Capacity (1/2" A307 Bolt)				
	Ult Load / Bolt	Factored Load (ϕ=0.75)	# of Bolts	Factor Joint Capacity
Axial (lb)	8226.7	6170.0	2	12340
Shear(lb)	5133.3	3850.0	2	7700

Interaction Check	
$T/\phi T_n$	34.3%
$V/\phi Vn$	30.3%
≤1.0	21.0%
	OK